b JDF

LSHTM
0011307280

To be returned to

UNIVERSITY OF LONDON LIBRARY DEPOSITORY,
SPRING RISE,
EGHAM,
SURREY.

Sir Patrick Manson F.R.S.
with the authors kind regards
J.H.

March 22 1906

LONDON SCHOOL OF
LIBRARY
TROPICAL MEDICINE

LONDON SCHOOL OF
LIBRARY
TROPICAL MEDICINE

ON LEPROSY AND FISH-EATING.

PLATE I.

FROM AN OLD PRINT.

[*Frontispiece.*

ON LEPROSY AND FISH-EATING.

A STATEMENT OF FACTS AND EXPLANATIONS.

LONDON SCHOOL OF TROPICAL MEDICINE
LIBRARY

BY

JONATHAN HUTCHINSON,

F.R.S. AND F.R.C.S.; LL.D. GLASGOW, EDINBURGH, CAMBRIDGE AND OXFORD; D.SC. LEEDS
AND HON. M.D. DUBLIN. FORMERLY PRESIDENT OF THE ROYAL
COLLEGE OF SURGEONS.

LONDON:
ARCHIBALD CONSTABLE & CO., Ld.,
16, JAMES STREET, HAYMARKET.
1906.

4/3

BRADBURY, AGNEW, & CO. LD., PRINTERS,
LONDON AND TONBRIDGE.

PREFACE.

THE object of the present work will be obvious, indeed possibly somewhat too conspicuous, on almost every page. It is to carry conviction to my readers that the fundamental cause of the malady known as true leprosy is the eating of fish in a state of commencing decomposition. Let me assert in the outset, and in the clearest possible terms, that no accusation is made against fish-food in general. It is only against bad fish. The fish which is supplied to the English market, whether eaten fresh or salted, is obviously quite free from the risk of causing leprosy, and the same statement is true of that used in most well-civilized communities. The cause of the disease is some ingredient or parasite generated by, or introduced into, fish which has been either not cured at all or cured badly. Of fish thus specifically tainted a very small quantity may suffice, and it is probably of very exceptional occurrence. By the side of this main proposition—that decomposing fish is the one sole cause of leprosy—and in part dependent upon it, several subsidiary ones receive, in the following pages, much attention. Amongst these are the assertion that the malady is not contagious by touch; that segregation offers only a very minute amount of help as regards prevention; that the leper asylums of the middle ages were not the real causes of its decline; and that in all communities in which cured fish is an article of food the liberal use of salt is by far the most important preventive measure.

No pretence is made that the book has been written for medical men only, and I may confess that I am not unconscious that some apology is due to my brethren of that profession for venturing to bring before the public a question primarily of medical interest. My excuse must be the pressing importance of the subject and the shortness of human life. Most gladly would I have left it to physicians to record their conjoint verdict and give to the public advice which should have received a professional imprimatur were it not that meanwhile many thousands of our fellow creatures are incurring the heavy penalties of our delay.

My special interest in the subject of leprosy began in 1855, in consequence of my having observed some cases in London hospitals. The very peculiar character of the malady impressed me strongly and forced the conviction that it must be due to some one well specialised cause.

In 1863, I wrote for the London Hospital Reports a paper which foreshadowed most of my present conclusions. At this date there were very few well-informed persons who believed in personal contagion. The cases to which I refer had been admitted without scruple into the hospital wards, and a very general impression prevailed that the disease must be in some way connected with dietetic habits. A study of its geographical distribution convinced me that neither climate nor race could have anything to do with it, and the observation that it prevailed almost exclusively on islands, on the shores of continents, and along the course of rivers soon led to a strong conviction that it must be in some way connected with the eating of fish. This conviction was much strengthened by the fact that a popular impression to the same effect had been entertained in many different regions. From that date onward I have been a firm believer in what I have termed for convenience, "the fish-hypothesis," but not without having been obliged to allow it to receive from time to time important modifications.

My creed was much strengthened in 1869 by a visit to Norway. I had, during that visit, much intercourse with Dr. Daniellsen, Dr. Boeck, Dr. Bidenkap and others, and although none of these were willing to accept the fish-theory, they had none other to offer, since all of them denied contagion. Some "ill-understood telluric influence" was the final resort of Dr. Bidenkap after repeated discussions. Noting that Bergen had at that time the largest fish-market and the largest leper-home in the world, and that the Norwegian peasants actually preferred their fish in a state of decomposition, I returned, as I have said, with my conclusions much strengthened.

In 1874 came Dr. Hansen's memorable discovery of the leprosy bacillus. This I hailed with confident hope that it would lead to a recognition of the parasite in fish, and thus to the removal of all doubt. In this hope I was willing, for some time, to let the question rest. Years passed on, however, and although many observers examined specimens of fish, no one found the bacillus, and the chief outcome of the discovery was a vigorous revival of contagionist doctrines. It was assumed that a disease which had its own specific bacillus could not be due to any article of food, and must be invariably caused by personal communication. Meanwhile, from several observers came statements to the effect that the prevalence of leprosy was by no means always in ratio with the fish-eating proclivities of the population, and that it might even occur where, as was asserted, no fish was obtainable. To not a few this latter statement appeared to be unanswerable, and for a time the fish-hypothesis was very generally discredited. Although I had learned to be very cautious in the acceptance of evidence from out-of-the-way places, having found, over and over again, that the most positive statements of one observer were liable to be contradicted by those of another, it yet remained quite out of my power by any knowledge then in my possession to discredit them all. I suspected their inaccuracy, but could not prove it.

In 1890 there appeared in the report of a Government investigation as to the occurrence of leprosy in the colony of Natal the very definite statement that it was there met with amongst Kaffirs who never tasted fish, either fresh or cured. That, unless the suggestion that fish-eating was the cause of leprosy was to be abandoned, such a statement must be refuted or at any rate explained was obvious. I made a good deal of enquiry by correspondence without much result, and, indeed, as the statement was itself the result of careful and responsible investigation on the spot, confutation did not seem very probable.

In 1901 the state of my own health forced me to feel that the cause in which I still believed might soon be without an apologist, and the reflection that the establishing of an important truth might be thereby much delayed was followed by a clear sense of duty to do, without delay, all that lay in my power. Accompanied by my youngest daughter and by my friend, Mr. E. W. Swanton, in capacity of secretary, in the winter of 1901—1902, I visited Cape Colony and Natal. The results were of great interest. The fact was established beyond doubt that certain cases of leprosy had originated in Natal in persons who had not eaten fish, and that they had occurred in those who had associated with sufferers from the disease. In opposition, however, to the primâ facie suggestion that after all the contagionists were right, came the circumstances that these cases were exceedingly few in number; that where one had acquired the disease, hundreds equally exposed to risk had escaped, and that almost all the victims were young persons. In all instances the original cases had occurred in men who had been into Cape Colony to work, and had there presumably eaten bad fish. Reflecting on these facts it occurred to me that after all they did not in any way support the conclusion that contagion in the ordinary sense (by touch, clothing, breath, &c.) was the cause, but rather that the bacillus was communicated through the stomach by food contaminated by a leper's hands or by milk taken from the breast of a leprous mother. This mode of communication may be conveniently known as "indirect" or "commensal," and subsequent investigation has convinced me that it fully explains not only all that has hitherto been held to support the doctrine of direct contagion by touch, but that it also cuts the ground from under that of heredity. It explains, also, the well-observed facts that the disease is apt to cling to certain families and to show itself in successive generations.

All the facts which I obtained in South Africa supported the conclusion that the disease had commenced in those regions in connection with the establishment of fish factories at Cape Town, and subsequently on other parts of the coast, and that it had spread inland and northwards by the conveyance to those parts of badly cured fish. There remained, however, a stronghold of objectors in the case of India. Here it was alleged there were districts in which fish was not obtainable, and religious sects the members of which would under no circumstances eat it. In the following winter I made a tour in order to investigate these statements, and by the courtesy of the authorities in the various medical colleges I was allowed to give lectures at Colombo, Madras, Calcutta, Lahore, and Bombay. In all these places discussion was invited, and active debate usually followed. I have dealt in some detail in the Chapters to follow with Indian questions, and may here be content to say that at these discussions, whilst many important facts were elicited, nothing was brought forward which controverted the fish-hypothesis or supported that of direct contagion.

I had hoped to have published the present work some years earlier, for it was in point of fact almost wholly written out soon after my return from India. The pressure of many other engagements must plead in some degree my excuse. Although the delay is in some respects to be regretted, in others it scarcely is so. In the interval many new facts have accumulated and new criticisms have been elicited. Amongst the arguments, to which I cannot but think the reader may reasonably allow considerable weight, is the fact that although my views have been widely published and have been frequently repeated, not alone in medical periodicals, but in the world-read columns of the *Times*, no serious answer to them has been attempted. On the other hand, not a few would-be objectors have unwittingly contributed statements which much strengthen my case. Dr. Turner, of Pretoria, has written an elaborate report to show that the theory is not applicable to his district, but he abstains altogether from considering it in reference to other countries, and the most important fact which his statistics show as regards the Transvaal is that the Kaffir races are comparatively exempt. Now the Kaffirs are the very race concerning whom it is alleged that its members do not eat fish. In allusion to what I had asserted as to excessive prevalence in the Roman Catholic Church, Dr. Petersen, of St. Petersburg, writing of the Baltic Provinces of Russia, has alleged as an objection that the Protestants suffer more than the orthodox. Here, again, however, an objector supplies me with a fact, for the orthodox in Russia are forbidden fish on all fast-days, whilst Protestants are free to eat it. The influence of the Greek Church in this matter is the reverse of that of the Roman. By far the most important expression of dissent comes, however, from the veteran observer, Dr. Hansen himself. As the discoverer of the bacillus and one who has devoted his life's energies to the study of leprosy, Dr. Hansen stands as the first of living authorities on the disease. He has within the last year in two different medical journals recorded his most recent conclusions and, as is invariably his custom, with the utmost candour. His admissions are of the greatest value for my view of the facts. He now avows, in the clearest possible terms, that contagion does not explain the whole, and that there must be some other influence at work. Of the nature of this influence he asserts that we know nothing, but he does not offer any reason whatever why we should not believe that it is the eating of bad fish. I must not here repeat what I have written in the chapter on Norway, but in face of Dr. Hansen's recent declaration that the fish theory finds "no support in Norway nor probably in any other part of the world," I must simply reply that my much honoured friend gives an opinion from which I am compelled to differ. Norway appears to me to offer an object-lesson of the utmost value in reference to the causes of leprosy. The disease is unknown in large districts, and is abundant only in a few, and those few are its great fishing centres. The Norwegians have been notorious as eaters of decomposing fish. The salt which they use is all imported, and until recently Norway has been poor. Leprosy has always prevailed extensively in the countries to which the Bergen fish was chiefly sent. During the last half century civilization has advanced rapidly in Norway, and as a direct result leprosy has declined. The more carefully the facts are sifted, the more clearly, I feel convinced, will the fact be established that this decline of leprosy has been due to improved dietetic habits and not to isolation-homes which have never approached adequacy, nor to isolation laws which have never been enforced. Although Norway unquestionably stands foremost in the interest of the problems which it suggests, there are several other regions which are scarcely second. Although it has long been known that not the whole of China suffers from leprosy, but only its southern half, it is only of late that the full bearing of this remarkable state of things has been realised. In the most public manner, *i.e.*, in the columns of the *Times*, I have asked attention to the fact, and have offered my own explanation of it. It is that in the Pekin district there is next to no fish and abundance of salt, whilst in that of Canton there is plenty of fish and no salt but what is imported. My friend, Mr. James Cantlie, the editor of the "Journal of Tropical Medicine," and one of the first to elicit the fact to which I now refer, has reprinted my *Times* letter in his influential journal, and we have both of us begged those conversant with these districts to give it any other explanation which might seem feasible. Up to the present date no other explanation has been offered.

It is not difficult to explain the slowness with which the belief in the essential connection between fish and leprosy has made its way towards general acceptance. The problem is a complicated one, and its details are easily misstated and misunderstood. The fallacy involved in the assumption that if due to fish the prevalence ought everywhere to be in ratio with the amount consumed has long ago been exposed. There remain, however, a number of others which have to be reckoned with. The conditions which favour prevalence in one region, or which secure exemption in another, are various, and much patience is needed in order to give to them all in turn their due weight. In one place it may be the abundance of fish which conduces to the prevalence of the disease (as in great fishing centres), whilst in others its scarcity may bring about the same result. Under conditions which might seem almost to exclude risk, the ordinances of religion may introduce it, and under others which might seem to favour it the existence on the spot of an abundant salt supply may entirely neutralize the danger. It is the forgetting of one or other of the possible disturbing influences which has led many local observers to record opinions which would not have been formed had the appreciation of the real facts been more accurate. In India, for instance, the influence of local famines is frequently left out of consideration. These famines have a disturbing effect in several directions. They greatly reduce the number of lepers for the time being, and may thus change suddenly the statistical record, whilst by compelling all classes, irrespective of caste, to eat whatever can be had they may sow the seeds for a future crop of leprosy cases, the growth of which may, to those who have forgotten the antecedent, seem inexplicable.

It has sometimes been suggested to me that instead of accumulating evidence which after all is only of a circumstantial character, it would have been better to have sought experimental proof. Without doubt, if the bacillus of leprosy could have been shown to be occasionally present in decomposing fish, the fact would have carried conviction to the minds of many who are reluctant to entertain other kinds of evidence. One reason why I have not devoted myself to this department of investigation has been the assured conviction that the general facts were overwhelmingly conclusive and that they needed only to be clearly set forth. I have felt certain also that the search for evidence of the kind referred to would be undertaken by others better equipped than myself for such enquiry. A third and perhaps the most influential reason for my individual neglect of microscopic search in the incriminated fish, has been a deep distrust of the negative conclusion. Several facts make it at the least doubtful whether Hansen's bacillus in its developed form is ever present in fish, whilst it is in the highest degree probable that even if sometimes present it is exceedingly rare. If it were common, leprosy would be a thousand-fold more prevalent than it is. It is however quite possible that the ingredient present in the fish may be something quite different from the bacillus itself, and that it may even be of a chemical nature. No one doubts that sausages, rabbit-pies, ice creams, etc., may occasionally contain very active poisons. It would, however, be a hopeless task to undertake a promiscuous examination of these articles without any clue as to which were those tainted. In the case of leprosy we never have any such clue, for the poison has been received into the system years before its effects are manifested, and it is never possible to identify the parcel of fish which was its cause. For these reasons it has always seemed to me a very unhopeful undertaking to seek the bacillus in fish, and I have preferred to take what has seemed to be a shorter road to the desired solution. Nor can I feel that there is any cause for regret that this course has been taken. In the prosecution of the enquiry very remarkable facts have come to light, and the public mind has, if I am not mistaken, been brought to a point which, if not amounting to conviction, is at any rate close to it. The wide diffusion of information has also already produced good results, and in many directions the proper precautions are already being adopted.

Amongst the circumstances which must be kept in mind in seeking to explain the prevalence or otherwise of leprosy in any given district, I would mention the following: It may be assumed that the consumption of fish as food is a possibility in all parts of the world. The human race is not to be found anywhere where there is not water, and wherever there is water there will be fish. It is therefore in all regions a question only of less or more.

We may safely hold that the absence of leprosy under conditions otherwise conducive to it may be explained by the abundance of salt. Whenever salt is plentiful it will be freely used in the curing of fish, and the result will be an article not prone to decomposition. A similar result may sometimes be due to the coldness of the climate, as in the Arctic regions.

Leprosy may be absent in certain sections of a community in which it prevails, as the consequence of religious ordinance or social prejudice forbidding the use of fish-food; on the other hand it may prevail in excess under opposite conditions. Thus Roman Catholicism, by favouring the use of fish on its numerous fast days, conduces to it, whilst the Greek Church, by forbidding such food, does something towards the exemption of its followers.

When the opponents of compulsory isolation point to its many failures—in Crete, in South Africa, the Sandwich Islands and many other places—they are met with the reply that however seemingly rigorous, it was yet always incomplete. More rigour is demanded. Thus in Crete it is now recommended that a special island should henceforth be exclusively devoted to leprosy and that all cases should be sent there. On Robben Island the visits of healthy relatives have been reduced to a minimum, and it is rumoured that at Pretoria a visitor is not now allowed to sit within a few feet of his leprous friend. Similar measures may, possibly, under the recently proffered sanction of an English Physician (see page 365), be in store for Robben Island. The truth is, however, that the attempt to isolate lepers always has been, and always will be, illusory. In no part of the world is it more utterly illusory and further removed from completeness than in Norway, where it is held to be succeeding. The wise men of Gotham attempted to confine the cuckoo by building a wall to surround him, and when the bird flew over, regretfully admitted that they had not built high enough. So will it ever be with attempts to exterminate leprosy by isolation measures. How can you adequately isolate a malady which takes years to declare itself and of which at the same time the contagious influence is so insidious, so obscure and so slightly powerful that husband and wife hardly ever suffer together? Just as the men of Gotham ought to have wing-stocked the bird instead of trying to hedge him in, so ought all who are in earnest for the extermination of leprosy to address themselves diligently to the removal of the cause from which the disease takes its beginning.

I have to ask my readers' indulgence for the endless iterations which will I fear intrude themselves upon their notice in the following pages. In part the nature of my task has made them unavoidable and in part they have been due to the fact that the work has been compiled in fragments and under circumstances admitting of no continuous leisure. That more serious blemishes will not also be detected I do not dare to hope. Certain blunders which have been detected only just in time for their correction warn me that there may yet remain others which have escaped notice. I am no adept in arithmetic and my knowledge of the world's geography is far from being as detailed as an enquiry of this scope makes desirable. I have no wish whatever to deprecate criticism or to excuse inaccuracy, but there is one petition which I must most earnestly put forward. It is that the reader will not allow any faults of mine to prejudice the cause of my clients, but that he will accept with candid mind the general bearing of the facts adduced, and not permit any isolated errors of statement or of reasoning to invalidate the conclusions to which the drift of the testimony tends.

In order to facilitate the reader's appreciation of the mass of circumstantial evidence which I offer in the following pages, it may be convenient to give here a brief summary of the principal facts in reference to the disease under investigation. Amongst those which are generally acknowledged may be noted:

First.—It is of world-wide distribution.

Second.—It is of great antiquity.

Third.—It has a marked preference for certain localities.

Fourth.—It is the same malady in all regions and in all races.

Fifth.—It is of very scattered and scanty occurrence in many large districts which yet never become free from it.

Sixth.—There is an absolute absence of any evidence of contagion in connection with leper asylums, etc.

Seventh.—A large majority of its victims assert that they have never been exposed to any risk of contagion (*de novo* cases).

Eighth.—It is remarkably persistent in certain localities.

Ninth.—The proof of its being transmitted hereditarily is, for the most part, negative.

Tenth.—In no region where it has been long established, although it may have countless foci, does it ever in any one locality assume epidemic prevalence.

Eleventh.—It is prone to die out and leave large communities, amongst whom it had been prevalent, entirely free.

Twelfth.—In all declared cases it has a bacillus which very closely resembles that of tuberculosis.

Thirteenth.—Experiments in inoculation have almost invariably failed.

Fourteenth.—No primary sore or patch suggestive of infection by the surface is ever identified.

Fifteenth.—It may have almost indefinitely long periods of latency or incubation.

Sixteenth.—In almost all countries, and in all ages in which leprosy has prevailed, there has been a more or less general popular belief that it has been caused by fish-eating.

Seventeenth.—When two communities living in close proximity, the one addicted to hunting, the other to fishing, the latter may suffer severely, and the former may wholly escape.

Eighteenth.—It had been wholly or almost wholly absent from Cape Colony, Natal, the Sandwich Islands and some other places until factories for the curing of fish were instituted.

Speaking generally of the application of the fish-hypothesis as regards leprosy in the world at large, it may be asserted :

1. That it explains its antiquity.
2. That it accounts for its widespread prevalence.
3. That it explains its local distribution.
4. That it accounts for its excessive incidence in connection with the Roman Catholic religion.
5. That it explains the dying out of the disease in connection with the advance of civilization.
6. That it explains the persistence of the disease in certain localities (*e.g.* in Norway and Iceland from the large consumption of bad fish, and in Spain and Portugal from the Catholic fast days).
7. That it explains the great prevalence of the disease in Europe in the Middle Ages (Roman Catholicism) and its absence from Mid-Russia (Greek Church).
8. That it explains, also, the fact that although met with for the most part in association with poverty it not infrequently has its victims amongst the wealthy, whilst at the same time many communities steeped in poverty are yet wholly free from it.
9. That it explains the remarkable difference which is observed in many places in respect to the liability of the two sexes.
10. That it accounts for the occurrence of *de novo* and sporadic cases.

It remains that I should state as briefly as possible the practical conclusions to which my investigations have led.

In order to the prevention of leprosy it is desirable—

1. That information should be diffused in all communities in which the disease prevails as to the danger from eating decomposing fish.
2. At the same time, but as quite minor matters,

warning should be given as to eating food from the hands of lepers and as to allowing leprous mothers to nurse their infants.

3. All ordinances such as those of the Roman Catholic Church, which tend to create an artificial demand for salt-fish, should be revised.

4. Impediments to the liberal supply of salt, under all possible conditions, should be removed. All taxes on salt and all Government monopolies of the article should be done away with, and the working of salt mines and the manufacture of salt should receive any legitimate encouragement which the ruling power can afford. Salt is an enemy to disease in general, and in an especial sense it is the antagonist of leprosy.

5. The fish-curing trade should everywhere come under the supervision of the Government. The best methods of curing should be enforced and the sale of an unsound article, as far as practicable, prevented.

6. Whilst the compulsory detention of leprosy patients in asylums is wholly unjustifiable, and almost wholly useless, it is yet to be desired that homes should be freely provided into which the indigent should be admitted. These homes should be made attractive, and by their aid the small risk, which undoubtedly exists of commensal communication would be for the most part removed.

CONTENTS.

CHAPTER PAGE

I. PRELIMINARY—THE LEPROSY PROBLEM STATED AND ILLUSTRATED 1

II. THE PHENOMENA OF LEPROSY 21

III. PROBABILITIES AS TO THE NATURE OF LEPROSY . 29

IV. THE WORLD-WIDE PREVALENCE OF LEPROSY — AN ARGUMENT IN SUPPORT OF ITS FOOD ORIGIN . . 38

V. THE FISH HYPOTHESIS STATED 44

VI. NO SPECIAL KIND OF FISH 49

VII. *DE NOVO* CASES AND THE INFERENCES FROM THEM . 51

VIII. ON THE CONDITIONS UNDER WHICH LEPROSY HAS DECLINED IN CERTAIN COUNTRIES 58

IX. ON THE CONDITIONS UNDER WHICH IN CERTAIN COUNTRIES LEPROSY HOLDS ITS GROUND . . 64

X. LEPROSY DOES NOT COMMONLY SPREAD BY CONTAGION 70

XI. ON DIFFICULTIES IN THE RECOGNITION OF LEPROSY . 84

XII. LEPROSY IN RELATION TO RELIGIOUS CREED . . 91

XIII. THE LEPROSY OF THE BIBLE 108

XIV. ON THE DISPROPORTIONATE PREVALENCE OF LEPROSY IN THE TWO SEXES 110

XV. INDIAN OBJECTIONS TO THE FISH-HYPOTHESIS . . 118

XVI. LEPROSY IN CAPE COLONY AT PRESENT DATE . . 127

XVII. HISTORY OF THE ORIGIN OF LEPROSY IN SOUTH AFRICA 137

XVIII. LEPROSY IN THE NATAL COLONY 147

XIX. VISIT TO A SOLITARY LEPER NEAR MARITZBURG . 152

CHAPTER PAGE

XX. ON DENIALS OF FISH-EATING BY INMATES OF LEPER ASYLUMS 155

XXI. ON THE NECESSITY FOR CAUTION IN ACCEPTING EVIDENCE 161

XXII. ON THE DISAPPEARANCE OF LEPROSY BEFORE ADVANCING CIVILIZATION 167

XXIII. FISH-CURING IN CAPE COLONY 178

XXIV. ON THE IMPORTANCE OF SALT 187

XXV. NOTES FROM MY INDIAN TOUR 192

XXVI. LEPROSY IN NORWAY 201

XXVII. LEPROSY IN CHINA 210

XXVIII. LEPROSY IN COLOMBIA 218

XXIX. THE SANDWICH ISLANDS 226

XXX. LEPROSY ON THE CONTINENT OF NORTH AMERICA . 235

XXXI. LEPROSY IN RUSSIA 239

XXXII. LEPROSY IN THE TRANSVAAL 247

XXXIII. LEPROSY IN CRETE 253

XXXIV. LEPROSY ON THE CONTINENT OF AUSTRALIA . . 257

XXXV. ON RECOVERIES FROM LEPROSY 268

XXXVI. ISOLATION INEFFECTUAL IN THE MIDDLE AGES . . 278

XXXVII. THE LEPER-HOUSES OF THE MIDDLE AGES . . . 286

APPENDIX—PART I. MISCELLANEOUS QUOTATIONS AND STATEMENTS OF FACTS 303

PART II. NOTES FOR A GAZETTEER OF LEPROSY . 369

INDEX 409

LIST OF MAPS AND ILLUSTRATIONS.

PLATE		FACING PAGE
I.	AN OLD PRINT	*Frontispiece*
II.	PORTRAIT (BEFORE LEPROSY)	21
III.	PORTRAIT (FOUR YEARS AFTER LEPROSY)	22
IV.	MAP OF THE WORLD	39
V.	MAP OF AFRICA	126
VI.	KAFFIRS FEEDING	129
VII.	KAFFIR KRAALS	149
VIII.	MAP OF ASIA, ETC.	193
IX.	ASONSOL HOME FOR CHILDREN	195
X.	BIDENKAP'S LEPROSY MAP OF NORWAY	201
XI.	CANTLIE'S LEPROSY MAP OF CHINA	212
XII.	OUTLINE MAP OF CHINA	214
XIII.	MAP OF SPAIN	285
XIV.	NEWMAN'S MAP OF ENGLAND	289
XV.	MAP OF SOUTH AMERICA	305
XVI.	MAP OF WEST INDIAN ISLANDS	407

CHAPTER I.

PRELIMINARY—THE LEPROSY PROBLEM STATED AND ILLUSTRATED.

[*Reprint of an article in the* FRIENDS' EXAMINER, 1895.]

THE problem of Leprosy is not for the idle-minded. It is full of intricacy and difficulty. The facts are apparently conflicting, and they can be reconciled, if at all, only by great patience and attention to detail. For those, however, who can bring to the task a fair stock of patience, a moderate knowledge of history and geography, and a good memory, the labour will not be without its interest, nor, I think, without its reward. However repulsive the disease itself in some of its phases may be, there is nothing whatever of that nature about its study. It is a sort of aristocrat amongst diseases, being possibly the very first which got a name; and the history of its prevalence, increase, and decline in different regions of our globe, is interwoven with that of civilization itself. A full account of it would indeed constitute a very important chapter in the history of the progress of mankind. Of its origin we know nothing. We find it common in very remote periods of national life—amongst the Egyptians, for instance—and many facts favour the belief that it has prevailed, not by transference from place to place, but by spontaneous origin, in almost all parts of the world. In a general way it would seem that it has receded as the comforts of life have increased, and more especially as agriculture has been developed; but although undoubtedly in the main one of the curses of poverty and of savage life, it continues at the present day, in certain localities, to attack those who have never deviated from a high standard of cleanliness and diet. It is not necessarily connected with poverty and degradation, for there is good reason to believe that a majority of the lowest races of mankind have known nothing of it. It is incident to a certain phase of civilization rather than to its entire absence. Of our fellow-countrymen who go out into districts where it prevails, whether as soldiers, civil functionaries, or missionaries, a few return to us as lepers, and in them the disease is precisely the same, and runs the same course as it does in the native, and as it has done, so far as we can judge, in all past time.

The death from leprosy of a devoted Roman Catholic priest, Father Damien, in the Sandwich Islands, whither he had gone to live amongst lepers and to do them good, and the highly praiseworthy action taken upon that event by H.M. the King, then the Prince of Wales, had the effect twelve years ago of strongly attracting public attention to this terrible malady. A National Leprosy Fund was founded, with the double object of attempting to better the condition of lepers in the British Dominions, and of trying by systematic investigation at home and abroad to solve the mystery of the cause of the disease, and thus do something effectual for its prevention. For myself, having then for nearly thirty years held an unwavering conviction that neither the cause nor the means of prevention are far to seek, I hailed this public awakening with the deepest gratification. It was the thing for which I had longed. Although, of course, in many of its details, the disease is one for purely medical study, yet it is exceedingly important that the public mind should be well informed as to the main facts. Of a large section of the facts concerned, a non-professional mind is just as capable of judging as a physician; and if its prevention is ever to be accomplished, it will be by the co-operation of the public and not solely by the action of medical men.

The Nature of Leprosy.—This is now fairly well understood. It is the same disease in all countries, and everywhere it is quite different from all other maladies. With the exception perhaps of tuberculosis, it appears to have no near relations, and when it leaves any given locality it leaves it wholly. The first appearance of leprosy is known by an affection of the skin. Little brown patches appear, which differ from all other skin diseases in that they are followed by loss of sensation. These multiply. Often this stage occupies years, and their subject meanwhile does not know that he is ill. Gradually spreading, the whole skin may become affected in a dreadful manner, the limbs may become almost useless, and the patient pass into a state of most pitiable decrepitude. It is upon these, the later stages, that all our popular notions of the disease are based, and it is of subjects in this stage that the inmates of leper-houses chiefly consist. The disease is a very protracted one. It disables long before it kills, and on an average perhaps ten years of helplessness may be expected. If we count the introductory stage, during which it is often not recognized, probably five other years should be added. Not all lepers die of it. Under favourable circumstances recovery takes place, but it is not unfrequently with the hands and feet crippled, and it may be with the eyes much damaged. One of the most distinguished preachers in the United States ten years ago was a gentleman of upwards of sixty, who, between the ages of twenty and forty, went through all the stages of leprosy and recovered; he was, however, nearly blind and very helpless. Recoveries are, however, exceptional, and they occur almost solely to those who are able to leave the country in which the disease began. It has recently been proved, following the researches of Dr. Hansen, of Bergen, that a minute parasitic organism, a bacillus, is invariably present in leprosy. This discovery is of the utmost importance, and helps us to understand how the disease should maintain its individuality. In a sense this bacillus may be counted as the cause of leprosy. The question remains, What is the cause of the bacillus, and how does it gain access?

Leprosy in Ancient Times.—No one who recognizes that leprosy is in the main a very protracted disease of the skin, and that it is only to be distinguished with difficulty from others which resemble it, will need to be told that in times of medical ignorance the utmost confusion prevailed. Thus the word which our English translators of the Bible have rendered "leprosy" included probably all chronic skin diseases and many which were not chronic. This is made clear by the fact that the ritual of thanksgiving for *cure*, and that, too, after very short periods of treatment, forms a principal topic in the Bible references to the disease. The disease to which we now restrict the name is in the main incurable, and although it is certain that the Hebrews had it amongst them, yet we must regard most of the Bible statements as belonging rather to other maladies. The same remark applies to all mediæval literature on the subject, and to much which is more recent. The old leper-houses contained many who were not lepers in our modern sense; and to this day the reports of its prevalence in India and elsewhere are rendered to some extent untrustworthy, by the fact that other diseases are counted with it. In particular there is a disease attended by white patches (leucoderma) which has nothing to do with leprosy but is constantly confounded with it. No condition of general whiteness is ever produced by leprosy, and the "leper white as snow" of the Bible narrative was certainly not the subject of leprosy in the modern sense.

Making all allowance, however, for sources of fallacy, we may safely believe that true leprosy existed in Egypt, Phœnicia, and amongst the Hebrews, and that it has been present from time immemorial in such countries as China and India. Maritime discoverers have found it apparently indigenous in almost all lands. Seldom have they found any trustworthy extant tradition as to its date of introduction or mode of origin.

During the Middle Ages leper-houses abounded throughout Europe, and were especially plentiful in England and Scotland. Lanfranc, in the eleventh century, founded one in Canterbury; but long prior to that others had existed, and legal enactments in reference to the disease had been in force.* It has been erroneously supposed that the returning Crusaders were the means of introducing leprosy into Europe. This is a great mistake, for leper-houses had existed prior to the first Crusade. It was undoubtedly about this time that they greatly increased in number and that attention was given to the disease; but it would be as erroneous to infer from this that leprosy was new, as to suppose that insanity is a novelty because lunatic asylums are in the main of modern origin. There is, indeed, no real evidence that the Crusades even increased the prevalence of leprosy. It is not probable that many Crusaders found their way to the coasts of Norway, yet it so happens that the first mention of leper-houses at Bergen occurs in 1256. In the fourteenth century leprosy began to decline in Europe generally. In 1434 we have record of the reduction of a leper-house in Durham because lepers could not be found, and this fact probably represents the state of things over England and inland Europe generally. The disease lingered last in the Shetland and Faroe Islands, and it was not till 1742 that the Shetlanders were able to hold a thanksgiving service for its final disappearance. The last case in Cornwall occurred about the same date. From all other parts of the British Islands it had long before this wholly vanished. It is customary to say that the diminution of leprosy in England began with the Reformation; and if the fact were so, I should welcome it as lending some support to the belief that fish-eating is the cause of the disease, since with the change of religious belief came the abolition of fast days and of much almost compulsory consumption of fish. But the truth is that leprosy was declining in England more than a century before the Reformation; and although its disappearance may have been hastened by that event, it certainly was in relation chiefly with other causes.

---

* Pepin in 757, Charlemagne in 789, and Rothar, King of the Lombards even in the preceding century, passed divorce laws in reference to leprosy. The first law that I know of in England was in 950 but there was a leper-house in Ireland as early as 869.

Lepers at Present in England.—At the present day there are no indigenous lepers in England, Ireland, Scotland, or Wales, nor, perhaps, have any appeared for more than a century. The disease, so far as we know, has left no traces. A certain small number of imported cases are, however, always amongst us. Retired army officers, or soldiers, who have served in India or elsewhere; missionaries, or their wives or children, who have lived abroad; these several classes each supply a quota to the number of lepers who are at the present moment living scattered amongst our home population. The nature of the disease is always carefully concealed both by medical men and their patients, and, there being in most cases but little visible to betray it, its subjects mix with their friends as usual. Children go to boarding-schools, husbands live with their wives and families, and hospital patients are admitted into the common ward.* No special precautions are in England taken against contagion, yet the disease never spreads.

Immunity of the United States.—In connection with this assertion of the disappearance of leprosy in Europe before the advance of civilization, it may be of interest to note that it has never developed in the northern States. We have witnessed in North America that which the world had perhaps never before seen, colonization on an enormous scale without any initiatory stage of material hardship. The arts of life were taken across the Atlantic in fair perfection, agriculture was rapidly developed, and almost from the first bread and meat were cheap. Not only has leprosy never developed itself in the northern States, but the experience of Norwegian immigrants has fully proved that it cannot thrive there when imported. Emigration from the leprosy districts of Norway has been very free, and many lepers, at all stages, have been taken from Norway to these States. It would be too much to say that they have usually got well, but this much is certain, they have not spread the disease either by contagion or heredity.† Their children have been born free from taint, and the disease has in all cases died away with the individual sufferer. Leprosy cannot thrive, cannot indeed continue to exist, under the conditions of life which are found inland in the northern United States.*

---

* In making these statements I have no wish to excite alarm. The total number of lepers now in England is probably very small, and there is not, I feel assured, the slightest danger from their presence. It is to be remembered also that the presence of imported lepers in England is no new thing. They have been here in variable numbers, but under conditions similar to those described in the text, ever since the cessation of the malady as an indigenous disease in Great Britain.

† These facts were established many years ago by a careful inquiry, conducted by Dr. Holmboe, of Bergen, and I believe they have been recently confirmed by Dr. Hansen.

The Present Haunts of Leprosy.—The disease is at present abundant in Iceland, on the west coast of Norway north of Bergen, in the West Indian Islands, on many parts of the coast of South America, in India, Japan, China, Burmah, the Straits Settlements, and in Crete. It has smaller but possibly increasing *foci* at the Cape, in the Sandwich Islands, in Ceylon, at New Brunswick, and in California. It still lingers in small and decreasing numbers in certain spots in Spain and Italy, in Palestine, Egypt, and other parts of the lands near to the Mediterranean, at one or two places in Sweden, and a few in Russia.

As a general statement, it is true that all the places where leprosy now prevails are either on the sea-coast or near to rivers or lakes. An exception to this, probably not so great as it at first sight appears, occurs in the case of India. With the single exception of this proximity to water and to the means of obtaining fish, I know of nothing which the present haunts of leprosy can be said to possess in common. They are places most dissimilar as regards climate, food supply, and the conveniences of life. The inclement climate of New Brunswick and of northern Norway produces apparently precisely the same result as the tropical heat of Colombia, Burmah, and the West Indian Islands. In Norway, the poor fishermen who suffer from leprosy live under great privations, and are exposed to hardships of all kinds. In Brazil, the life of those who suffer from a malady which, be it remembered, is exactly the same in both places, is one for the most part devoid of hardship, and often surrounded with luxury.

A very remarkable and instructive fact is to be noticed as regards the present leprosy haunts, that although the same malady everywhere, it affects in the tropics all classes, whilst in temperate regions it attacks only the poor. From temperate regions it vanishes before the development of agriculture, but in warm latitudes it shows no such tendency. No Englishman going to live in Norway need entertain the slightest fear of contracting the disease, but the risks, although still small, are very real in the case of Burmah and the two Indies.

---

* A small apparent exception to this is to be made for California, where it has been taken by the Chinese; and still smaller ones for one or two other places, but these are all on the sea-board.

I have in what has been said above omitted much that is of importance in reference to the nature and history of leprosy; but if I am not too sanguine, the reader who has followed me thus far will be in a fair position to form his own judgment of the main features of the problem. I will briefly summarize my principal assertions, most of which have already been hinted at.

Leprosy is a well-specialised disease. It is the same in all parts of the world where it occurs, and has probably been the same in all ages.

It appears to have no allies. Gradations of severity are common, but no diseases, not actually leprosy, have as yet been proved to be in any degree connected with it. If there be an exception to this it is in the case of tuberculosis.

It is not modified by race. It sometimes, however, affects one race to the almost total exclusion of another living in the same district.

It is not for practical purposes contagious, not even communicable from husband to wife.

Yet it sometimes prevails in families. In explanation of family prevalence it is suggested that nursing mothers may convey it to their children, and that it is dangerous to accept food from a leper's hands.

It is endemic—that is, it has its haunts. Where endemic, it sometimes affects certain classes, to the exclusion of others, whilst in other places it may attack all alike.

It affects both sexes, but shows, in most places, are markable preference for males.

It may occur at any age, but is chiefly a disease of early adult life.

It may wholly cease in certain localities.

It is possibly hereditary.

It has usually a long period of latency before its outbreak. This period may be as long as twenty years.

It may be produced in immigrants, or even visitors to leprosy districts; but usually only under conditions of conformity to the habits of the people.

It may occur sporadically—that is, in populations but little liable to it.

It may perhaps help the discussion of our problem, and serve to prevent the extension of my preliminary chapter to undue length, if I now avow my own belief in the form of two propositions. The first is that the evidence as to leprosy makes it certain *that the poison which produces the disease gains access to the body in the form of food.* It is self-evident that the disease, if contagious at all, is so in the feeblest possible degree. Its main cause of spreading is certainly not contagion. Nor does it spread solely or chiefly by inheritance, for an Englishman going to live in a leprosy district may acquire it in a year or two. It cannot possibly be due to any telluric emanations, for it occurs in such different places, and it affects comparatively but few in each place. It has clearly nothing to do with temperature or climate. Nor is it a result of poverty or of neglect of the ordinary rules of life, for it attacks in both Indies persons who have enjoyed every comfort and have never deviated in any way from the strictest purity of outward life (young children and others). It is clear, then, I submit, that the poison must be taken inadvertently in connection with some kind or kinds of food. No other hypothesis can be suggested which in any degree adequately meets the facts, and this one does so. What articles of food are we then to suspect? Here my second proposition finds place. It is that *the evidence as regards this disease points to fish as being in all probability the vehicle by which the poison of leprosy gains access to the human body.* Under the term "fish" let it be understood that, for the present purpose, I include edible molluscs, crustaceans, and all living denizens of water, both salt and fresh. The fish hypothesis of leprosy is not new. In all ages, and in all countries where the disease has prevailed, fish has from time to time come under more or less of suspicion. In 1867 the College of Physicians published a large collection of evidence as to leprosy, collected at the request of the English Government from various parts of the British dominions. From this report and from a few other sources I will take almost at random a series of extracts bearing upon the question of food in general, and of fish-food in particular, as being possible causes of the malady.

ICELAND.

Dr. Holland, in Sir George Mackenzie's "Travels," 1812:—"The diet of the Icelanders consists almost solely of animal food, of which fish, either fresh or dried, forms by far the larger proportion. Scurvy and leprosy are common in the island, especially on parts of the western coast, where the inhabitants depend chiefly upon fishing."

"The College of Physicians' Report" (p. 43), quoting from Schleisner:—"I wish to call attention to the remarkable circumstance, that upon the whole north and east coast—tracts of country where no fishing is carried on—

very few lepers indeed are to be found; while one-third of the whole number of the island are to be met with in Guldbringe Syssel, and there principally in one parish, where the chief fishing-stations are situated."

RUSSIA.

Liveing* writes:—"In Central European Russia leprosy is unknown; but it is met with at two opposite extremities of the Empire, namely, on the shores of the Baltic and the Caspian. Amongst the inhabitants of the northern shores of the Caspian, it is said to be chiefly confined to the Russians, who alone are engaged in the fisheries, while Kalmucks and Armenians generally escape."

SWEDEN.

Liveing* (p. 42), quoting Dr. Hjort:—"In the last century 'there were large herring fisheries on the coast of Bohuslän, and at that time leprosy was exceedingly common in that district; but after the herring shoals in 1807 left that locality, and showed themselves on the Bergen side of the country, the leprosy almost entirely ceased on the coast of Sweden. The disease, however, seems to have accompanied the herrings to the Bergen shore, for it is precisely from that time that leprosy has increased so remarkably in the western districts.' But while bearing in mind the change of occupation of the Swedes, consequent on the loss of the fishing trade, we must not forget that during the last half-century they have made considerable progress in agricultural pursuits, and this has led to a general improvement in the condition of the poorer classes."

---

* See "Liveing on Leprosy."

SOUTH AMERICA.

"Palgrave mentions salt fish as a main cause of leprosy among the South American negroes (Creoles). He also disbelieves in its contagiousness." (*Fortnightly Review*, December, 1875.)

NEW BRUNSWICK.

In New Brunswick the disease is prevalent chiefly among the poor of the French settlement of Tracadie and its neighbourhood. "In the winter their diet consists solely of salted herrings, and salt and dried cod-fish, frequently offensive from decomposition, potatoes, and at times salt pork; in summer they live on fresh fish: they have very little bread. They are chiefly employed in fishing, and agriculture is shamefully neglected."

THE FAROES.

Liveing* (p. 31), quoting Dr. Hjort, says:—"We learn from the Faroe Islands that the disease has there diminished, and is now almost unknown, since the great sea fishings were relinquished and more attention has been paid to agricultural pursuits."

JAMAICA.

Dr. Bowerbank says:—

"*c.* The cleanliest and the dirtiest appear to suffer equally. The Jews, who are very cleanly in their habits, appear to suffer most.

"*d.* The Jews and coloured people generally consume a large quantity of fresh, as also of salted and kippered, fish." (Col. Ph. Rep. 12.)

---

* See "Liveing on Leprosy."

BARBADOES.

Dr. Young:—"It is most frequent among the poorer classes. It occurs chiefly in low-lying, dry and hot districts, and along the sea-coast. The dwellings are small, and generally densely inhabited; the personal habits of the people not cleanly. The ordinary diet of the people is scanty, and consists chiefly of salted and fresh fish, with vegetable matters."

I quote the following from a diet-table of a Lazaretto in Barbadoes:—"*Breakfast:* Rice or corn-meal, or sweet potatoes, or bread, with milk and molasses, or chocolate or coffee, *and* 2 *oz. of salt fish daily.*"

TRINIDAD.

Dr. Saturnin says:—"The almost entire use of salted meat and fish," &c., are aggravating conditions when the disease has once shown itself."

(Favouring circumstances):—

"*d.* Deficient and innutritious food. The poor live much on tainted fish and vegetables, such as plantains, yams, &c."

NEVIS, WEST INDIES.

Dr. Augustin says:—"Where the patient is dirty, and where meat is exclusively used for diet, or, in the case of negroes, whose lymphatic system is affected by their food, which consists of vegetables and salt fish, the disease gains ground rapidly."

BAHAMAS.

Dr. Chipman says:—"I have a strong opinion that the poor diet generally of the lower classes, and the frequent use of fish and pork, increase the tendency to its development in the hereditarily predisposed."

ST. VINCENT.

Dr. Arnott says:—"I consider the ordinary diet of the population (consisting chiefly of salt fish, vegetables, corn-meal, fresh fish, with a very insufficient proportion of fresh meat and bread) to be unfavourable to the preservation of good health generally."

CHINA.

Around Shanghae. Dr. Henderson says:—"The country is intersected by small ditches and canals, and there is much stagnant water, with many paddy-fields. Leprosy is not more common on the sea-coast than inland." "The food of the people consists chiefly of rice and vegetables; the lower classes eat large numbers of small crabs, which abound in the ponds and ditches."

Hong Kong. Dr. Dickson says:—"Fish diet, especially shrimps, believed to excite leprosy." (Coll. Ph. Rep. xxxiv.)

Dr. A. F. Anderson, of Singapore, in his "Report on Leprosy at the Straits Settlements" (p. 4), writes:—"As regards diet the Chinese are exceedingly obstinate. They will have salt fish and pork, with salted vegetables, in a state of putridity. The other native races are more amenable in the matter of diet; and I may remark here that in the treatment of leprosy *diet is of the greatest importance.*" The italics are Dr. Anderson's.

CEYLON.

"An entirely fish or salt-fish diet, and want of cleanliness, invariably occur among the natives who are subject to the disease. (T. A. P.)."

INDIA.

Bengal. Dr. J. Jackson (Hendon), late of Bengal, writes:—"In Bengal the disease is of the most frequent occurrence in the lowest class, especially the fishermen, who live chiefly upon fish, and that in a semi-putrid state." . . . "Their diet is of rice, not the best, and fish with vegetables, made into curry or boiled. All the waters of Bengal abound in fish, and this forms a main article of diet; very few of the people take animal food. Their occupation is frequently that of fishermen."

Patna. Dr. Sutherland writes:—"Fish, as an article of diet, is used by every class of the natives, and, in a country where decomposition is rapid, it often happens that it is sold in a tainted state to the poorer classes. The use of tainted fish is believed, I think justly, to be a cause of leprous disease." . . . "Leprosy is not uncommon in the middle classes of natives."

Pooree. Dr. Durant writes:—"The ordinary diet of the poor people chiefly consists of boiled rice, vegetable curry, or fish, either fresh or dried," &c.

Nimar. Dr. Hunter writes:—"The ordinary diet consists of cakes made of wheaten flour or dâll, rice, ghee, &c.; some low-caste lepers eat meat and fish, found dead, and devour generally what they can get."

Cuttack. Dr. Mantell writes:—"*d.* As regards the diet of leprous persons, I find they live chiefly on rice, pulses, and vegetables, and occasionally flesh. All agree in saying that the eating of fish increases the disease; and it is only when they have given up all idea of being cured that they become callous, and make it an article of diet."

MAURITIUS.

(Aggravating conditions):—

Mr. Ford says:—"Poverty, close, unwholesome dwellings, want of cleanliness and pure air, unwholesome food, as too much of fish, and above all of pork, especially its grease."

"The natives believe that the too frequent use of pork as a diet, as well as certain kinds of fish and fruits," are exciting or predisposing causes, as well as aggravating the disease when begun.

Grenada.

Carribee Islands. Dr. McIntyre says: — "My three patients lived in a healthy, inland, hilly situation, in comfortable wooden houses. They lived principally on a vegetable and fish diet, and were on the whole in comfortable circumstances."

British Guiana.

Dr. Reed says:—"The mass of the population live on vegetables—as plantains, tanias, cassava—salt fish, and salt pork."

Leprosy is common in certain parts of British Guiana, and there is a leper-house, from the diet-table of which I extract the following:—On Monday, salt fish, 5 oz.; Tuesday, ditto, 2 oz.; Thursday, ditto, 2 oz.; Friday, ditto, 2 oz.; Sunday, ditto, 6 oz.*

I feel almost sure that those who read this list of quotations, and take them in connection with what has gone before, will be inclined to exclaim, "Can there be any doubt?" Is it not clear that fish-eating is the cause? How comes it that medical men familiar with such facts have not long ago warned the public, and thus prevented the spread of this horrible disease? There is, however, I must now hasten to admit, another side to the question and another class of facts. So far as I know, the fish hypothesis meets the facts fully in all parts of the world excepting India. Although it is true that we encounter leprosy in communities where no great excess of fish is taken, and in individuals who will assert that they have never been especially fond of it, yet, if we accept the proposition that the special poison may occasionally be present in an active form in small quantities of fish, there is no great difficulty encountered in cases of this kind. It is at any rate clearly possible that fish may have been the cause in them also, and against the enormous mass of evidence which appears to connect the disease with fish they count for little. From India, however, we get another class of facts, or at any rate of assertions. We are told that certain castes are restrained by their religious prejudices from ever eating animal food of any kind; that there are districts in which fish cannot be obtained, and which yet suffer from leprosy; and, what is yet more to the point, that of the inmates of leper-houses many will tell you that they never in their lives tasted fish. The instance is constantly quoted of a certain tribe, the Somalees, who, having come to the conclusion that fish was the cause of leprosy, determined to abstain from it, and did so, yet still continued to suffer. Thus, then, it would appear that the tables are turned, our argumentative labour lost, and that we are as far as ever from the discovery of the cause of leprosy.

---

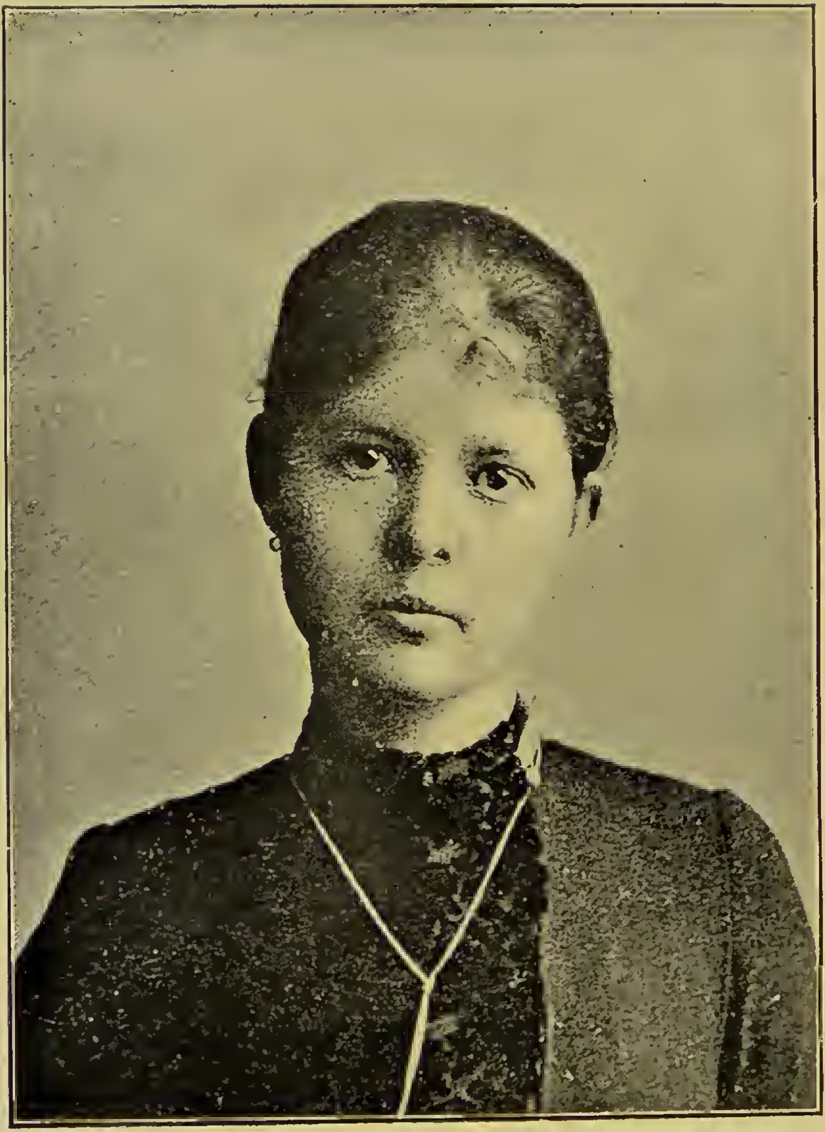
* My reason for giving the dietary of leper-houses is, first, to illustrate the food-habits of the district; and, secondly, to give a hint as to why the disease is regarded as so incurable.

Is it, however, really so? Are the difficulties which are cited in the case of India really such that we ought, as reasonable men, to at once abandon the hypothesis? I admit their force, but I am not convinced. In the first place the main facts in India, as everywhere else, support the fish theory. As a rule there, as elsewhere, leprosy is a disease of the sea-boards, of rivers, and of populations which consume fish. As a rule, those castes which reject flesh food suffer but little in comparison with those who take it. It is rare for high-class Brahmins to become lepers. On this all are, I think, unanimous. As regards, then, the occurrence of leprosy in certain districts, inland or upland, where there is little or no fresh fish to be had, I would suggest that although there may be but little, that little is probably—from the distance it has had to travel—very bad. In reference to religious prohibitions, I would ask, are they always obeyed? Mahometans, in spite of prohibition, do sometimes take wine, and some Jews do eat oysters and pork. It may possibly be the fact that Brahmins do sometimes take fish, and it may be that the fish thus taken, as it were surreptitiously, is precisely of the kind likely to be dangerous. I allude especially to potted fish and to compounds eaten as a relish in small quantities but usually in a state of partial decomposition. We know the temptations which savoury condiments of this kind offer to the palates of those who are restricted to vegetable food. Next it is to be remembered that the creed in some instances forbids the taking of life, but does not forbid the eating of what is found already dead or of what has been killed by others. Here is a loophole of great importance. Nor must we forget how readily and how frequently the human conscience permits the evasion of interdicts which are onerous. All these considerations being kept in mind, is it reasonable to accept as conclusive the statements of Indian lepers as to their own habits of diet, more especially when the truth would to them involve the confession of moral delinquency? Ought not the assertions to which I have referred to be carefully sifted on the spot, and in a sceptical spirit, before we allow them such force as should overthrow a conclusion which is so well supported in other directions?

Postscript to Chapter I.

I have reprinted in the above chapter a paper which I wrote in 1895 for the *Friends' Examiner;* a few verbal alterations only have been made. The paper gives in popular form the general facts of the Leprosy problem, but the reader must be good enough to remember that it does not quite express my most recent opinions, and that it does not embody a very large amount of evidence which has since accumulated. In particular, it was written prior to my tours in South Africa and in India. Most of the topics adverted to will be developed at greater length in subsequent chapters.

PLATE II.



PORTRAIT OF THE YOUNG WOMAN WHO IS ALSO THE SUBJECT OF THE NEXT PLATE. THIS WAS TAKEN THREE YEARS BEFORE THE LEPROSY COMMENCED.

[*To face page* 21.

CHAPTER II.

THE PHENOMENA OF LEPROSY.

In the preceding chapter I have attempted a general sketch of the whole subject. I now proceed to examine in more detail the various topics which it concerns and will take first the Phenomena of the disease.

It is a mistake to suppose that leprosy is always attended by great disfigurement. In its early stages in almost all cases there is little or none. These early stages often extend over several years, and during them the leper may mix with his fellows without the slightest risk of recognition, and he usually continues to enjoy good health. It requires a skilled observer and a good opportunity for observation to recognise the disease in such cases. In some the patient never gets beyond that stage and may recover without its ever having been ascertained that he was the subject of this terrible malady. In others, and the majority, the course is, however, different.

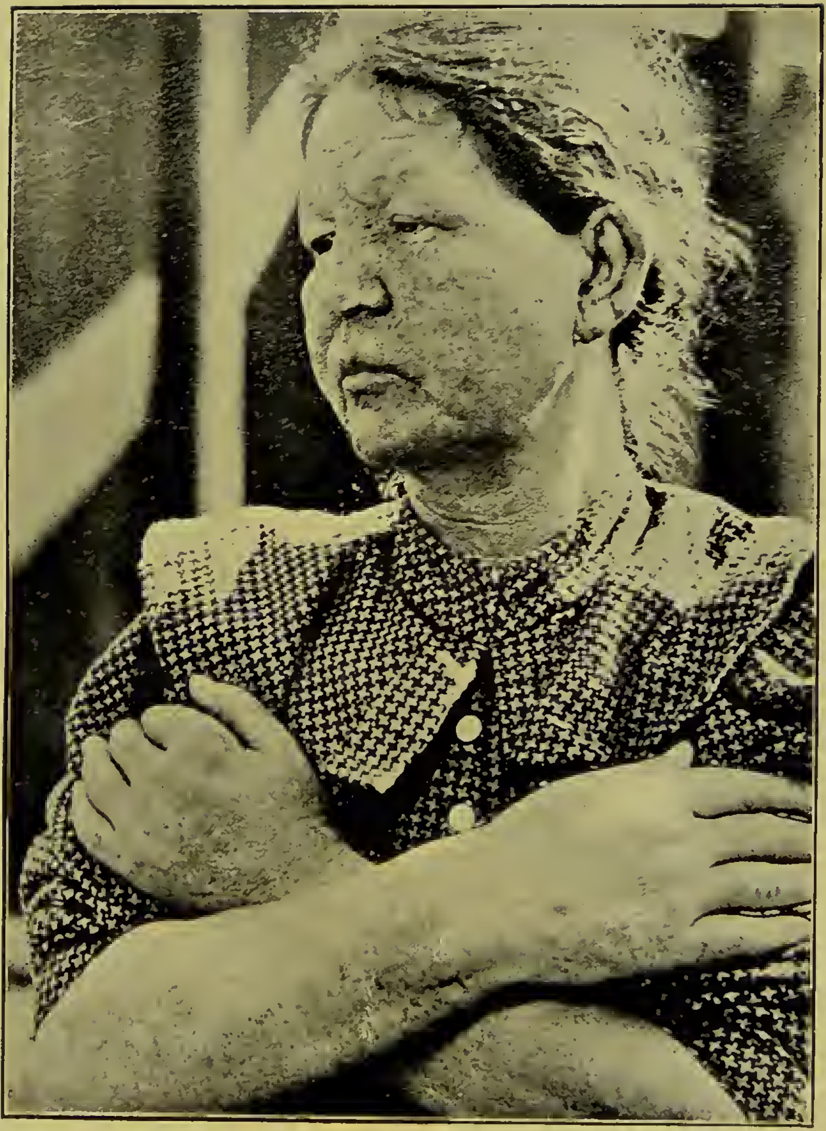
Definition.—Leprosy may be defined as being:—*A long protracted, often fatal, but self-terminable bacillary disease, in which the peripheral nervous system and the skin are chiefly affected; and in which loss of sensation, muscular paralysis, erythematous tumefaction of the skin and acroteric necroses are usual phenomena.*

Pictorial illustrations of leprosy are plentiful. The conditions displayed in aggravated cases are conspicuous and lend themselves readily to the camera of the photographer and to the artist's pencil. For the most part, however, only aggravated cases are selected and it is the so-called tuberous form which is almost invariably depicted. Thus the leonine physiognomy, with its repulsive hypertrophies, has assumed a very false position in the imagination of those not personally conversant with the disease. It is thought to be the ordinary characteristic of the malady, whereas it is a comparatively rare one and always a transitory stage.

The ordinary phenomena of the disease may help us somewhat in our conjectures as to its real nature. They are usually—perhaps invariably—displayed in the first instance by the skin, but very important implications of nerve-trunks follow in a large majority of instances. It may be safely believed that when such is the case the nerve trunks usually receive their infection from the skin originally affected. The progress is that of an ascending neuritis. Briefly, then, it may be said that the first symptom implying the presence of leprosy is the appearance of dusky brown patches on the skin. In a white person and on the trunk, the patches often look much like those caused on a sheet of paper which has been scorched. A single one may be present for a long time before others appear, but more usually many are developed together and they are usually arranged with fair bilateral symmetry on the trunk and four limbs. These patches are not at first deficient in sensation, but, after a time, white areas begin to appear in their centres, and where whiteness occurs there sensation is usually more or less completely lost. In many cases before this stage is reached the patches have coalesced, and the entire surface has become of a dusky *café-au-lait* tint. In these discoloured and erythematous areas, the skin is a little swollen, but often not so much so as to attract notice. In some cases, however, and especially on the face and hands, it is very greatly thickened and may be thrown into nodular folds.

The parts which are exposed to the sun and air—the

PLATE III.



PORTRAIT SHOWING THE DISFIGUREMENT CAUSED BY LEPROSY. IT IS A PORTRAIT OF THE SAME YOUNG WOMAN WHOSE FACE IS SHOWN IN THE PREVIOUS PLATE, AND WAS TAKEN SEVEN YEARS LATER. LEPROSY HAD EXISTED FOUR YEARS. (Copied with the preceding from Photographs published by Dr. Grünfeld, of Odessa.)

[*To face page* 22.

hands and the face—often suffer in a manner peculiar to themselves. The thick skin of the face, as might be expected, shows the increase of thickness more conspicuously than other parts, and the features are greatly changed, more especially the sides of the nose, the eyebrows, the lobules of the ears and the lips ; all these parts become tumid and firm. The hairs of the face and especially those of the eyebrows, fall out. The lumpy thickening of the parts just named so changes the features that a child may come to look like an aged dwarf.* It is quite impossible to guess at the age of a leper in whom the face is affected. The hands and feet rarely show the brown discoloration which is so characteristic on the trunk. Owing to the feeble state of the circulation in them, they usually become livid and dusky rather than brown. They are, however, always somewhat swollen and look clumsy. No doubt the process in them is the same as in the other parts, but it is modified by local peculiarities. There can be little hesitation in believing that the process is one of dermatitis, involving destruction, to greater or less extent, of the tactile organs of the skin (the "end-organs"), for as the swelling subsides, the parts are left defective in sensation. A leper in this condition may burn or cut his fingers without knowing it, or he may have sores form, or portions of his digits drop off without experiencing pain.

The loss of common sensation and of perception of pain and of temperature, which is such a well-known and common condition in leprosy, may be brought about in two different ways, which it is important to distinguish. It may be caused by damage to the end-organs in the skin itself, or by damage to the nerve-trunks. As already suggested, the trunks suffer secondarily and the end-organs are probably infected before them. In some cases the nerve trunks suffer but little, or it may be that they appear to escape. The severity of the skin affection is no measure of the risk to the nerve-trunks, but rather the reverse. When loss of sensation in the skin itself results from damage to the end-organs, it may be compared to loss of sight from disease of the retina, and when it is from damage to a nerve-trunk it resembles blindness from injury to the optic nerve. In leprosy, however, the two conditions are usually present together, the one leading to the other. They may, however, be discriminated to some extent by their results, for the one leads to general and diffused numbness of the whole surface, often without any degree of muscular paralysis, whilst the other affects certain known regions of nerve-distribution, and is always, when the nerve is a mixed one, attended by corresponding muscular failures. A leper in whom the skin only has lost sensation, but whose muscles have not failed, and who retains the muscular sense, may be able to use his hands, and even manage carpenters' tools; but one in whom the muscles have suffered is often deplorably helpless.

---

* "Facies deformis tuberibus callosis ; ozœna ; raucedo ; cutis elephantina, crassa, unctuosa ; in extremis artubus anæsthesia."—*Definition of Leprosy, by Sauvages* (1759).

"Redde whelkes and pymples on the face, out of whom oftenne runne blood and matter ; the noses swelle and ben grete ; the virtue of smelling faileth, and the brethe stynkyth ryht fowle. . . . The infectyd are unclene, spotyd, glemy, and guyttery ; the nostrils ben stopyl, the wasen (weasand) of the voys is rough, and the voys is horse, and the here (hair) falls."—*Glanville* (*Fourteenth Century*).

The statements which have just been made apply chiefly to the early and middle periods of a leper's career. They are often the only ones, for contrary to general belief, leprosy may be arrested at any stage, and is by no means a necessarily fatal malady. If all lepers could be liberally fed and cared for, probably but few would die of the disease itself. Unfortunately, however, in the majority these conditions are not to be obtained and various complications may ensue which entail very serious results.

Following what has just been said it is very important to point out that although the leprosy processes are usually very slow, they are seldom stationary. They are either aggressive or retrogressive, and there is, if the patient survives for a certain time, a very definite tendency to recovery so far as the destructive changes already accomplished may permit of it. The soundness of the cicatrisation which results, is often very remarkable and also the extent of restoration of nerve function. These facts strongly support the suggestion that the parasitic bacillus cannot maintain its activity in the same tissues indefinitely. The phenomena of leprosy are, as I have endeavoured to explain, the combinations in varying proportions of the results of dermatitis and of neuritis. Some of these results are primary or immediate, and others are remote or secondary. We may fairly grant that the bacillus may be present in the tissues without evoking symptoms either in the skin or nerves, and without causing inflammation of any kind. Probably it is so in many cases, and during very long periods of time. But of such conditions we know of no symptoms, and it is probable that none are produced. It is only when the bacillus assumes activity, and when either by itself or its toxine it begins to cause local changes, that we recognise its presence. When that stage is reached it is probable that its multiplication is usually rapid, for the phenomena in most instances are those indicating its general diffusion. They would seem to imply its presence in the blood either free, or as is more probable, in the white cells.* The facts as regards bilateral symmetry imply blood poisoning, whilst at the same time they by no means exclude the occurrence of diffusion by the lymph channels, or of direct communication by continuity of tissue. Probably all three are in force at the same time and in all cases. The enlargement of lymphatic glands and the demonstrated presence of the bacillus in them proves the one, and the serpiginous extension of patches in the skin, and the fusiform swelling of long tracts of nerve-trunks implies the other.

---

* Hansen, and other observers, have both described and figured the bacillus in the blood.

In all cases, if carefully looked for, the phenomena of both neuritis and dermatitis will be found together, and that, too, almost from the beginning of the illness. They may occur, however, in very varying proportions, and present very different resulting conditions. The bacillus would appear to have a special tendency to attack the areolar investments of the peripheral nervous system, and to produce, probably by pressure, interruption of function; or it may be permanent disorganisation, more or less complete. We do not as yet know much as to the pathological process in the end-organs of the skin—the dermato-neuritis—but numerous observers (beginning with Danielssen and Boeck) have recorded detailed observations on that of the nerve-trunks. Many authors have written as if they thought that the anæsthesia so commonly displayed by the skin in leprosy is always and solely the result of neuritis of nerve-trunks. It is from it that the classification of leprosy into the "tuberose" and the "anæsthetic" groups has so long maintained its position. There cannot, however, be any reasonable doubt that all forms of leprosy are attended by some degree of anæsthesia, nor that there are, as has been stated, two quite different modes in which such anæsthesia may be produced. Peripheral neuritis (by which we may mean inflammation of nerve-trunks), is only one, and it is perhaps of less importance because less nearly universal, in leprosy than is dermato-neuritis (*i.e.*, destructive implications of the nerve structures in the skin itself). The skin is, indeed, an outspread organ of sensation, and as has been suggested its sensory functions may be disturbed in modes just as distinct and as widely different as are choroido-retinitis and optic neuritis in the case of the eyeball.

It is probable that no form of leprosic dermatitis leaves the skin intact as a sensory organ. The degree of loss may fall far short of complete anæsthesia, and may even be so slight as to be difficult of demonstration, but it is always present.* Now as there are many different forms of dermatitis in leprosy, so there are different distribution areas of the resulting paræsthesia. In some it is in well-margined patches, distributed either with symmetry or without, and in others it is either acroteric or obscurely diffuse, whilst in a few it is almost universal.

The differences which leprosy presents in different cases may be assumed to be due chiefly to differences in the constitutional proclivities of the patient rather than to the bacillus itself. The latter is always essentially the same. It may be admitted, however, as not improbable, that after it has entered into symbiotic union with the cell elements of any one tissue it will tend more or less to restrict itself to that tissue. This is the pathological law under which we seek to explain the permanent differences in the several lupoid forms of tuberculosis of the skin, and it probably applies also to leprosy. The type once taken is kept to. Under this law—if it be one—the bacillus having once commenced its life-activity in a certain structure, will there produce infective cells, which will by preference develop themselves in tissues of precisely the same kind, it may be on exactly the opposite half of the body. If a nerve-trunk have been attacked other nerve-trunks will follow suit. Thus a certain sameness of type is often preserved throughout the case.

---

* It may be well here to remark that uneducated persons are prone to deny all slight degrees of anæsthesia. If they can feel at all they assert that they can feel well. It requires great patience and plenty of time to make certain on this point in many cases of leprosy.

Although we assume that the lepra bacillus is the final cause of leprosy, and that it is present in all cases and in all lesions (that is, in their early stages), yet it is undoubted that its abundance and its energy of multiplication are very different in different forms. In the cases to which the terms "tubercular," "tuberose," "nodular," &c., are applied it is usually very abundant, whilst in those which approach the type of the "purely neuritic" it is often only scanty. In the former there is often much œdematous swelling of the parts affected, in the latter but little, or even none. In the former, the mucous membranes and internal viscera may be infected, in the latter they usually escape. A liability to ulcerative destruction of parts occurs in the former, leading to crippling of hands and feet, &c., whilst the latter are liable to muscular contractions and to the mutilations from gangrene and from loss of bones, which are the secondary and remote consequences of severe damage to nerves. The conditions referred to are, however, often inextricably mixed, and no strong lines of demarcation can, consistently with clinical truth, be drawn. Even the time-honoured and usually accepted division into "tubercular" and "anæsthetic" is an arbitrary one, and is productive of much misconception. As being to some extent convenient in a popular sense it will probably continue to be employed, but all clinical observers aiming at accuracy and clear ideas ought to lay it aside.

There is but one leprosy. It is the same disease in all countries and in all races, and has probably been so in all ages.

CHAPTER III.

PROBABILITIES AS TO THE NATURE OF LEPROSY.

WE have in the last chapter seen that it is probable almost to a certainty that the phenomena of leprosy are due to the presence of some element in the blood. This element is an infective one—infective that is to the individual in whom it exists—and may cause in succession large tracts of skin, or long lengths of nerve-trunks, to swell and suffer damage. The discovery of Dr. Hansen has shown us that this element is a minute microbe, almost identical with that which causes tuberculosis, and to which the name of *bacillus lepræ* has been given. This microbe may be found in immense quantities in all cases of tubercular leprosy. It is given off with the discharges from leprous sores, and leprous patients blow it off in large quantities from their nostrils. It is, however, not certain that when given off from these sources it is still living. It may be dead and inert. At any rate, it is the fact that very persevering attempts to inoculate animals and men with this bacillus have failed. It will not live—so far as we at present know—elsewhere than in the living human body, and in it only when the conditions suit it. We have no experimental demonstration whatever to guide our speculations as to how this microbe has originated, nor yet as to how it is conveyed into the bodies of those in whom it luxuriates. We are left, then, to circumstantial evidence, and have to discuss probabilities rather than established facts. Let us see where the probabilities lie.

It is perfectly certain that this microbe may be obtained in an active state in some countries whilst it is not to be had in others. No one at the present time residing in England fears to become a leper, whereas any trader or missionary going to India, the West Indian Islands, Iceland, China, the east coast of Norway, the Sandwich Islands, or even South Africa, and living as do the poorer classes in these districts, encounters a not very inconsiderable risk, which risk is not wholly removed by living a very careful life, nor by the utmost care as to cleanliness, and immunity from every species of hardship. The places which have just been named make it quite evident that climate, air, soil, weather, &c., can have nothing to do with the cause of leprosy. It is not possible to imagine a greater contrast than between the climates of Iceland and Norway, and those of India and Jamaica. The Norwegian fisherman, it is true, lives a life of hardship and exposure, but his compeer in the West Indies one of indulgence and almost luxury, yet they both alike suffer from the same malady. It can therefore have nothing to do with influences of climate or mode of life.

The argument just advanced may be strengthened by recollecting that the disease has wholly ceased to prevail in the British Islands, in Central Europe, and some other regions where it once flourished, although no material change in climate, &c., has taken place.

The somewhat meaningless term, "Telluric influence" has appeared to be acceptable to certain investigators who have been driven to their wits' end to suggest some cause for the distribution of leprosy. It means, I suppose, some emanation from the interior of the earth, or some modification of its electric or other physical conditions. Now, that such are present in leprosy districts is not only unproved but infinitely improbable. It was to this suggestion that a very distinguished Norwegian authority, with whom I conferred in Bergen some five and twenty years ago, was driven after I had refuted all other propositions. I was obliged to reply that he was taking refuge in a word which—as distinct from what we understand by climate—had no real signification. That the presence of leprosy has nothing to do with intemperance, immorality, or a dissolute mode of life is most certain, for its victims are not infrequently children, industrious and frugal women, or it may be zealous missionaries. A fact of great importance in guiding our conjectures is that leprosy appears to have prevailed from time immemorial in the most distant parts, and often in wholly isolated regions (islands, &c.). It was known long ages ago as the "Phœnician disease," then as the "Egyptian disease," and one French physician, who had travelled in the South Pacific, asserted that there was not an inhabited island in that region in which it was not indigenous. This may be too strong a statement, but at any rate we may believe that it only a little exaggerates the actual facts. In Fiji there are prehistoric inscribed stones which refer to leprosy, and the native names for it which are found in so many languages imply alike its prevalence and its high antiquity. Now from the really contagious diseases, such as small-pox, measles, hydrophobia, and others, most of these districts are wholly exempt. From these maladies many regions have suffered for the first time subsequent to the advent of Europeans, and in some instances, owing to careful precautions, they are still exempt. Leprosy, on the contrary, has been well-nigh ubiquitous, and has occurred under conditions which are very suggestive of spontaneous or *de novo* origin. The only other ubiquitous disease with which we are acquainted is tuberculosis, and it has prevailed over the whole world, and in all races with much the same kind of irregular incidence that we witness in the case of leprosy. The two are presumably closely allied, and some slight but all-important change in conditions may possibly transmute the one into the other.

I have already implied that leprosy is no respecter of race. In some regions it may appear to be so to some extent, but for this special explanation must always be sought. It is beyond dispute that it is the same malady in aboriginal and highly civilized communities, and amongst the inmates of such lazar-houses as that on Robben Island, which receives its prisoners from the mixed population of South Africa, representatives of a dozen different races may be found under the same roof, suffering from the same malady and contracted in the same regions.

Having thus, I trust, made it clear that neither neglect of cleanliness, poverty and poor food, exposure to hardship, climatic influences, nor peculiarities of race have any distinct connection with the production of leprosy, may I venture to suggest to my readers that no one of them should ever again be referred to as if they were such. The coin has been shown to be spurious, let it be nailed down. The attempt to pass it after its character is known will make the perpetrator amenable to the laws of common sense.

We have thus cleared the ground. Leprosy is quite a special disease, in all countries and races it is the same, and it must be due to some quite special cause which may be of almost universal prevalence. We have, I think, shown further that it seems highly probable that the cause must be one capable of almost spontaneous production, since the disease has originated apparently *de novo* in many and very distant places. Further we have shown that its cause is apparently one which may easily cease to exist in any of its native homes, since in countless districts the disease has silently died out.

Now the facts cited and the inferences fairly deducible from them seem to point with firm finger to the conclusion that the efficient cause of leprosy must be some article of food. By no other supposition can we possibly explain its *de novo* origin, its restricted prevalence, and its apparently spontaneous decline. In adopting such a conclusion it is not necessary to suppose that the bacillus itself is actually present in the suspected article of food. It may be that it only contains some ingredient which has the power of modifying the tubercle bacillus and giving to it a peculiar range of activity. Facts which are incontestable in regard both to the bacillus of tubercle and that of leprosy make it clear that this parasitic organism may remain for indefinite periods latent, but not dead, in the tissues of its host. It may be that during these long periods of rest it is susceptible of modifications, and that the food taken by its host is one of the most efficient means of its modification.

Asserting then as a probable conclusion that some article of food is the cause of leprosy, we have next to ask to what article of food does suspicion chiefly attach. Clearly it must be some article which is of universal use, and which has the same qualities in all lands. It must be one to which aboriginal populations, as well as highly cultured ones, have access.

We may put aside at once all kinds of food derived from vegetables. There is no vegetable which is met with in all the districts afflicted with leprosy; and besides, as a general fact it may be asserted that the disease recedes *pari passu* with the development of agriculture and gardening. Milk and various products come under a more reasonable suspicion, and have in fact often been suspected; but then there are some races, the Tartars for instance, who almost live on milk and have no leprosy, and there are many leprosy centres where milk is almost or wholly unknown.

Further it is the fact that leprosy prevails on sea-boards and in fishing districts where cattle are often scarce, and avoids mountains and inland plains where cattle are numerous. Of flesh foods it may be said at once that there is no reason to suspect that of animals and birds, for the disease occurs without any sort of connection with their consumption. Pig's flesh has been suspected, but all over the world the Jews are very liable to leprosy and they never touch it. In many of the islands on which leprosy has prevailed amongst the natives no form of mammalian flesh, and probably but very little of that of birds is obtainable. There was much leprosy in New Zealand at the time of its discovery by Captain Cook, at which date the Maoris, however, had no mammalia excepting rats, and their food was almost exclusively fern roots and fish.

It may to many seem an over-refinement to deny that leprosy has any claim to rank as a specific disease. Much, however, depends upon our definitions of terms. That leprosy in many of its forms is a well-specialised malady capable of easy recognition and the most definite separation from all others it would indeed be ridiculous to deny. This, however, does not quite constitute specificity. The question is, does it always depend upon one and the same cause, and is that cause one insusceptible of modification ? Does it always breed true, and is it impossible to produce it except by sowing its seed, that is, by breeding it from a parent stock ? Syphilis and small-pox are specific diseases and they meet the requirements indicated. Gout, although well specialised, is not a specific disease, and it does not conform to them. If leprosy and tuberculosis are at any stage transmutable, then neither the one nor the other should be called specific. Our opinions upon this point will depend much upon the position which we assign, in the rôle of leprosy phenomena, to its bacillus. Is that bacillus under all its conditions unchangeable, and has it existed unchanged through all the ages of medico-historical time, always producing the phenomena of leprosy and none others? It is possible to grant that the presence of this bacillus is an essential condition to the evolution of leprosy without going so far as this. It is conceivable that there may be some more nearly primitive organism of almost ubiquitous distribution which is capable of development under different conditions, now into the bacillus of common tuberculosis and now into that of leprosy. It may further be the fact that the food upon which it is fed is the most important agent in furthering such differentiation.

I may confess that the attitude of conjectural doubt hinted at in the above sentences is much that which my mind tends to assume in reference to both tuberculosis and leprosy. It seems doubtful whether either of them is in a strict sense specific, whilst it must be admitted respecting both that when once its bacillus is well differentiated it is capable of originating the disease when transferred to a healthy organism. This does not involve the belief that the disease cannot be originated in any other way than by such transference. It may be possible to breed it (the disease) *de novo* as it were, and by the use of special food to cause living parasitic material of a previously innocuous character to assume activity and produce special results.

One form of my proposition is that the bacillus of leprosy may probably be, like those of tetanus and of tuberculosis, well-nigh ubiquitous, and that it assumes activity under the stimulus of some ingredient supplied by fish in an early stage of decomposition. Having once assumed such activity it can reproduce itself indefinitely in the tissues of the human body, and may be transferred from one person to another if taken into the stomach in a living state. The earliest indication of its presence is, as has been already said, usually an erythematous condition of the skin in which the sensory end-organs (papillæ) are specially involved, and from which by a process of ascending neuritis the peripheral nerve trunks become involved. The supposed distinctions between the different forms of the disease depend probably upon the more or less abundant reproduction of the bacillus. If its multiplication be very free there is swelling of the affected tracts of the skin, and a condition of generalised œdema results, which is most marked in certain parts, especially those exposed to light, and to changes in temperature. On these parts the œdema may be localised, and may cause the formation of lumps or tumours, the so-called tubercular form. Thus the swelling of the skin, whether general or local, is simply indicative of the severity of the case, and of the aptitude on the part of the individual for further development of the parasite. Although it is true that in the tubercular cases the stress of the disease seems to fall on the skin rather than the nervous system, yet there are none in which the skin is exclusively affected.

In all cases the nerves—both their end-organs and their trunks—are involved. Thus all cases of tubercular leprosy are, if carefully examined, found to be mixed cases; but there are many others in which the affection of the skin never rises to the production of anything which could be called a tuber. In all tubercular cases there is anæsthesia as well, but in many anæsthetic cases there are no tubercles. Thus, as has been said, severity of skin affection implies severity of case, and is probably due to special susceptibility in the individual. If a case is to be a severe one it is not difficult on the theory suggested to explain that the severity will probably declare itself early. Thus it is rare for a case which is not tuberculous in its early stages to become so in its later ones. Such accessions of severity are, however, not wholly unknown, but the rule is that a case which is only maculo-anæsthetic in its early stages will remain so to its end, and that its course will be more protracted than if the skin had been swollen in the first instance. These statements are in accord with general experience.

It is obvious that if the use of bad fish as food be the cause of leprosy, some difference in its severity and its course may be expected in relation to the continuance or otherwise of the use of the incriminated article. Thus in places where fish is very freely used the disease may be expected to be more severe than in those where it is only exceptional. It is not unlikely that facts will be found to support this conclusion. No country perhaps reports a larger proportion of tubercular cases than Norway, and from nowhere else do we get such discouraging statements as regards the progress and curability of the disease. During my enquiries in Ceylon and India, I could not resist a strong impression that the disease was usually of a mild type, and I was inclined to attribute this mildness to the fact that fish is not plentiful.

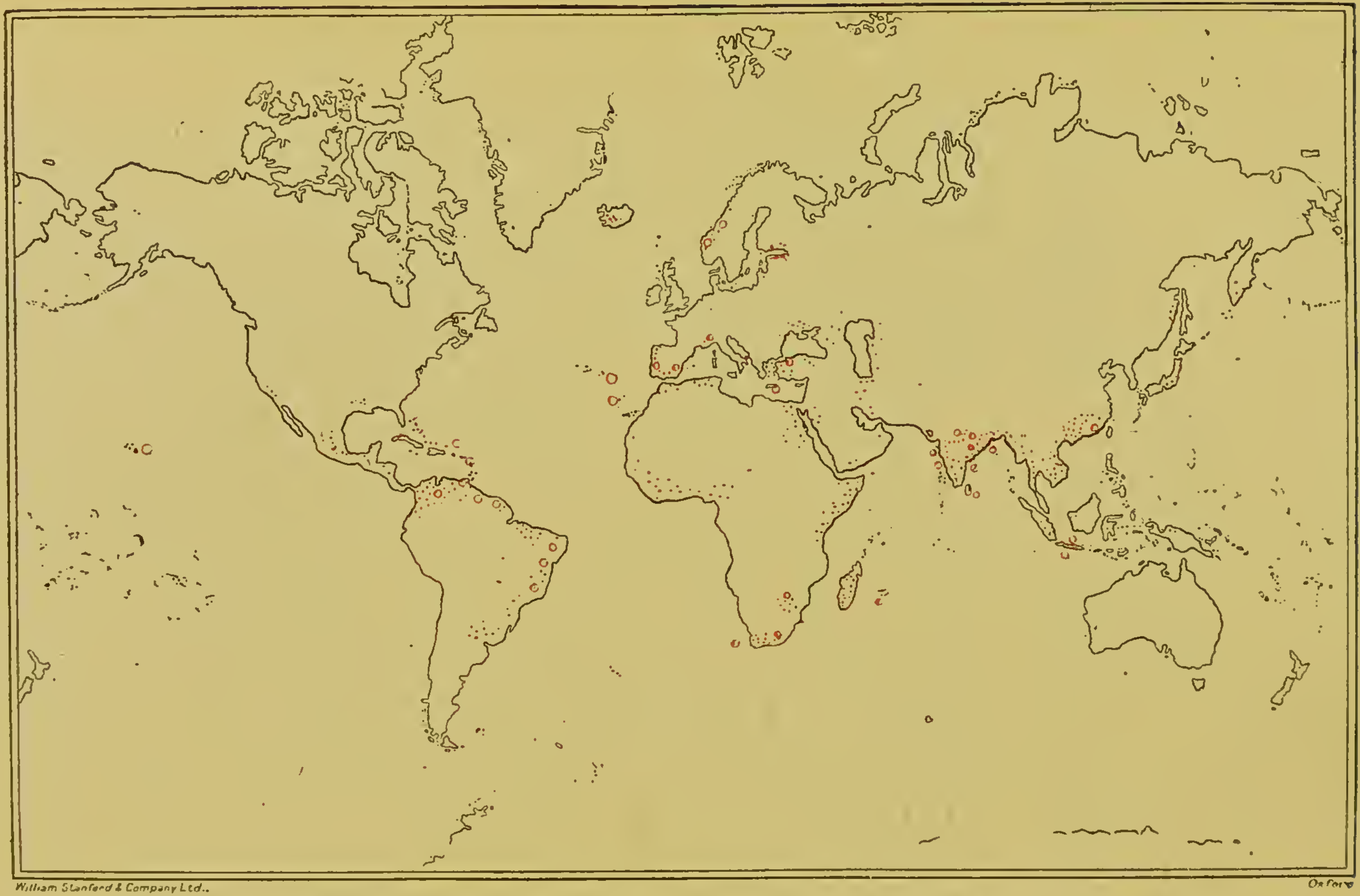
CHAPTER IV.

THE WORLD-WIDE PREVALENCE OF LEPROSY AN ARGUMENT IN SUPPORT OF ITS FOOD ORIGIN.

THE fact that leprosy is found in almost all parts of the world, and has been recognised as an indigenous disease in countless communities, is one which has not as yet received the attention which it deserves. Much the same assertions may perhaps be made as regards tuberculosis. There is probably no region of the globe concerning which it can be asserted that tuberculosis is wholly absent. The inference is that the bacillus of tubercle is one that is well-nigh ubiquitous and that the influence of surrounding conditions is chiefly that of favouring or repressing its activity. This doctrine by no means subverts the belief in occasional contagion, but it distinctly implies that personal contagion is not essential to the production of the disease. Between leprosy and tuberculosis there is, however, this important difference, that whilst tuberculosis may vary much in prevalence under different conditions in climate, food, and mode of life, but never wholly disappears, leprosy has a very definite, though not invariable, tendency to die out before advancing civilization and an increase of the comforts and necessaries of life. The inference from this fact is that some influence of a quite definite character must be engrafted on tuberculosis in order to evoke leprosy.

We are not acquainted with any disease which spreads solely by personal contagion which makes any approach to ubiquity. Rabies is wholly unknown in many large portions of our continents and probably in the majority of

PLATE IV.



MAP OF THE WORLD (MERCATOR'S PROJECTION) SHOWING THE DISTRIBUTION OF LEPROSY.

In this map only those places are marked where leprosy is endemic, and where it has shown tendency to increase. Thus Australia is left blank, for although a few cases have occurred there they have been almost all imported. There are more lepers in England than in Australia, but in neither place does the disease spread. Several recently established leprosy centres in connection with Russian penal establishments might have been marked in Siberia, but on so small a scale it is difficult to locate them correctly. The map given at page 193 may be consulted and compared.

[*To face page* 39.

islands. Small-pox was a new disease in the New World when Europeans landed there. Measles, scarlet fever, plague, and other infectious fevers are wholly absent from many countries and many races, and the date of their introduction into others can often be traced with certainty. Syphilis stands, perhaps, in a more questionable position, but the more carefully the facts regarding it be examined, the more confident will the conviction be that it was introduced *de novo* into Europe in the fifteenth century, and that it has spread into many other countries within historic times. In very many regions it has received names indicating its foreign origin. The facts as regards leprosy are very different. Isolation, even that of islands, has no influence in protecting from it. On the contrary, it has often seemed that such conditions have favoured its prevalence. It has been met with as an indigenous disease well known to the natives in hundreds of islands when visited for the first time by Europeans. Almost always under such conditions there are found traditions of its immemorial antiquity. In Fiji there are inscribed stones which imply its prevalence in ages long before the memory of its inhabitants. A French authority who had sailed in the Polynesian seas has asserted that leprosy was indigenous in all the inhabited islands of the South Pacific.* It might be difficult to find detailed proof of this statement, but that it implies very wide prevalence may be taken without fear of error.

Now the conditions prevailing in the places where leprosy has been found as an indigenous disease demand our careful study. In many they may be difficult of ascertainment, but in others they are not so.

When New Zealand was discovered by Captain Cook the Maoris were found to suffer from leprosy. It is known that they were accustomed to live chiefly on fern roots and fish, and that they had no mammals on the islands excepting a small rat. It is therefore conclusively established by this fact that leprosy can be developed independently of milk food, of tainted meat, of pork, or of diseased cereals. In further confirmation of this inference it may be stated that since the introduction by Europeans of domestic animals and cereals, leprosy has almost wholly, if not quite, disappeared.

---

* In Peschel's "Races of Men," page 352, we read "The Polynesians fish but do not hunt."

Although, however, it may be considered as proved that leprosy may make its appearance in any part of the globe, yet it has by no means been found everywhere. There are many obvious fallacies in the observations of early discoverers and of travellers in regions but little known. Seldom, indeed, have such pioneers been equipped with the knowledge needed for correct observation, and the diseases of the tribes they visited have usually engaged but little of their attention.

We have at the best only fragments of observation, and that of the most superficial kind. Yet when supplemented by subsequent investigation these fragments may become valuable. There is no reason to believe that leprosy existed in Australia or in Van Diemen's Land prior to the advent of Europeans, and even since that time the aborigines have never suffered. Now the natives of these regions were of the very lowest of the human race. If poverty and hardship and poor food could produce leprosy, they ought to have had it. They lived, however, chiefly by the chase. The kangaroo was their most valuable food, and the bow and arrow their weapons. Their extensive inland country is but very badly supplied with water, and their dependence upon fish as food must have been very little. What fish they could get was probably eaten raw, and immediately after capture. Of the arts of drying and salting it they knew nothing, and it is but too probable that, in a very literal sense, they lived from hand to mouth. What is true of the Australian aborigines is true also, to a greater or less extent, of many tribes of Indians in various parts of the world, living inland and addicted to hunting, and respecting some of these it has been especially recorded that they are free from leprosy. All over the world it is a disease of the tribes which fish, and not of those which hunt.

There has been much debate as to whether or not the Hottentot tribes of South Africa had leprosy prior to the advent of Europeans. They were a pastoral people, and probably did not fish unless quite exceptionally. Believers in the contagiousness of leprosy have been anxious to have it thought that leprosy existed amongst the Hottentots, and that it was from them that their Dutch masters derived it. But of this there is not a fragment of proof. When, in 1756, the first cases were brought to light in three Dutch farmers, living not far from Cape Town, a judicial investigation took place. Of this investigation official records remain, and not the slightest suggestion occurs that the disease was then known amongst their Hottentot slaves. Everything points to the conclusion that theirs were the only cases known in the colony. Those who are most desirous to assert that it was indigenous, and who trust what they call "Hottentot tradition," are yet fain to admit that it must have been very rare. But it may be replied, If present at all, and if contagious, why should it have remained rare? The mode of life of the Hottentots was such as in an eminent degree to have favoured the spread of any contagious disease. Why did leprosy remain so infrequent that it is exceedingly doubtful if it existed at all? The Dutch did not introduce any changes in social life likely to favour contagion. What they did introduce was the use of salt fish as an ordinary article of food, and it is almost certain that the first cases of leprosy in Cape

Colony occurred to themselves, and not to their Hottentot slaves.

If some little doubt is admitted as to whether the Hottentots were free from leprosy prior to their use of Cape fish, there is none whatever in the case of the Kaffirs. The Kaffir (or Bantu) tribes inhabiting the eastern half of South Africa (as the Hottentots the western) eat no fish and had no leprosy. They, like the Hottentots, lived a pastoral life, and subsisted chiefly on the produce of their flocks and herds. The date of the introduction of leprosy amongst them is well known, and unquestionably it was, in some way, connected with European influence. We have to choose between contagion and food : undoubtedly both were possible.

The results of European occupation of these districts was two-fold. We taught them that fish was eatable, and we attracted great numbers of Kaffir natives (both men and women) to the towns and to the mines. They were then taught to eat salt fish, and at the same time, it may be possible that they were exposed to risks of contagion. They took with them to their native kraals the germs of the disease and the practice of fish-eating. The disease spread extensively, though with very little intensity, and it is now very sparingly scattered over very large districts where a century ago it was absolutely unknown. That it spreads in part by commensal communication there can be no doubt, but, on the other hand, its prevalence is in the main commensurate with increased means of communication and the newly-introduced use of salted fish as food.

Nothing is, I believe, known as to the date of the introduction of leprosy into Norway and Iceland. Probably it has been present there ever since they were populated by a Scandinavian seafaring and fishing population. This, in the case of Iceland, dates back only a thousand years, but in Norway it is lost in obscurity. The statements which apply to them apply also to the British Islands and to Northern Europe in general. Although, however, almost universally prevalent in Europe in the Middle Ages, it was never quite so, for the large inland district of Russia has always been free. The suggested explanation of this is that while Roman Catholicism and its numerous fasts made the supply of cured fish a matter of necessity to the rest of Europe, the Greek Church which prevailed in Russia and observed the same fasts, forbade the eating of fish as well as of flesh meat.

In conclusion, we may, I think, without risk of error, hold that *the world-wide distribution of leprosy proves that it is not solely dependent upon contagion, but is capable of independent origination, and further, that the irregularity of its distribution makes it certain that it is produced by some article of food which is consumed in some countries and not used in others.*

CHAPTER V.

THE FISH-HYPOTHESIS STATED.

I HAVE been sometimes told that the fish hypothesis is continually changing its terms. To this my reply has been that the oak tree sheds its leaves once a year but remains throughout the same tree. It is quite true that in the early stages of the hypothesis the excessive consumption of bad fish or of uncooked fish was chiefly held in suspicion. Soon, however, the facts as to the acquisition of the disease by young children and by well-to-do persons who had resided for only short periods in leprosy districts, made it clear that excessive consumption could not be an essential. Thus the suspicion that some special kind of fish might contain the prejudicial element in a potent form, whilst the great mass of the article might be free from it, came into prominence. Hansen's discovery of the bacillus (1871) gave strength to this supposition. Next, the very definite fact that in many leprosy districts it was not those living actually on the shore but those at short distances inland who suffered most, gave importance to the suspicion that fresh fish even if eaten in a partially decomposed condition was less fraught with danger than fish in the dried or salted condition as adapted for transit. The remembrance of what happened in the Middle Ages, and what may still be observed in some Catholic countries, gave emphasis to this suspicion. It obtained support also from the observation that certain races forbidden either by national prejudice or religious creed to eat fish—Indians and Zulus—but who still partake of it occasionally in the cured state were liable occasionally to develop leprosy. Finally, the close similarity of leprosy with certain forms of tuberculosis, the similarity of the bacillus in both, the long periods of latency in both, were facts which impressed themselves, and which suggested the hypothesis that after all the two diseases were in close connection and might depend upon the same parasitic microbe stimulated by special food into special forms of activity. Certain facts not, I admit, yet well established, which imply that tuberculosis and leprosy are maladies one of which may substitute the other, and that one may increase while the other declines gave force to this suspicion.

Thus, then, the fish-hypothesis of leprosy has by several steps assumed its present form. Many years ago I called leprosy the "gout of fish-eaters." More recently I have preferred to call it "fish-eaters' tuberculosis." The bacillus of tubercle unquestionably possesses the power of remaining inactive in the tissues for almost indefinite periods, and may assume activity in connection with various agencies which lower the protective powers of the system, or possibly supply some definite stimulant to its germs. The belief that tuberculosis spreads by direct contagion from person to person is one which has probably had its day, and the suspicion that its germs are practically ubiquitous and existent in us all, waiting only for their suitable excitants to action, is one which may be expected to soon supplant it.

Thus, then, one form which the fish-hypothesis of leprosy at present takes is roughly this: It is suspected that the tubercle bacillus (existing in a latent state in many persons and often hereditary) may in certain individuals become modified by some element which exists in badly-cured fish, and may be made to assume the activities which result in the phenomena of leprosy.

No part of this proposition is, however, to be considered as established beyond the fundamental one that in some way the eating of bad or half-cured fish does cause the disease. From this there can be no flinching, for the circumstantial evidence is overwhelming. All the rest, although seemingly probable, must for the present be held in doubt and subject to modification by further investigation.

The terms just suggested would cover well all the facts as to leprosy, and would place it definitely as a form of scrofula. Now there is one special form of scrofula which comes so close to leprosy that it demands special mention. The skin disease, known technically as Lupus erythematosus, differs from leprosy conspicuously in the circumstance that there is no tendency to special implication of the peripheral nerves. This is a great difference, and it involves in advanced cases wide departures from the typical phenomena of the two maladies. After all, however, it proves nothing more than an aptitude on the part of the bacillus to attack certain tissues. In Lupus erythematosus it is the skin only which inflames, and chiefly the gland organs in the skin; in leprosy it is also the skin, but it is the nerve papillæ which chiefly suffer. "Dermatitis with dermatitic adenitis," or "glandular dermatitis" would properly designate the one, and "dermatitis with dermato-neuritis" the other. The phenomena of Lupus erythematosus may be briefly stated as the appearance of a patch of roughened and congested skin on some part of the face, to be quickly followed by others which are arranged with bilateral symmetry. These slowly enlarge and may cover the whole face, and spread to the chest, scalp, and shoulders. The hands next suffer—usually both of them—and the dermatitis on them is usually diffuse and not in patches. The disease attains its acme slowly in the course of years, and then begins to decline, and after a duration of ten years or more, if the patient lives, it comes to an end, and scars only are left. Many minor cases end in a much shorter time, or may prove abortive in the earliest stage. An attack of erysipelas is more or less curative, but often dangerous. The subjects of this form of "Lupus" are almost always of tuberculous families, and they often die of phthisis. Most of these statements are true of leprosy, but in Lupus erythematosus there is a tendency to limit the infected areas to the face, hands, and bust, which is not observed in leprosy. It is not, however, invariable in lupus. Both diseases spread presumably by self-infection, elements being produced by the earliest patches which become the parents of others. In this feature they are alike. They are alike also in the tendency shown to spontaneous subsidence after a duration of many years.

Many other features might be mentioned in illustration of the parallelism between the phenomena of tuberculosis (or perhaps still better of "scrofula" as including all forms of tuberculosis) and those of leprosy. It is quite certain that all forms of the former may, like those of leprosy, have very long periods of incubation. A person may be threatened many years before the definite outbreak occurs. In both we observe great variations in the acuteness and severity of the outbreak. In both chronic and insidious forms occur as well as severe ones. In both recovery is the rule if the patient survives, and after an apparent recovery there is very seldom any repetition of the outbreak. In both there are forms in which the search for the bacillus is usually negative. Thus the tubercle bacillus has not been demonstrated in Lupus erythematosus, nor that of leprosy in its maculo-anæsthetic form.

Although the suggestion just made that the ingredient in decomposing fish which induces leprosy is possibly not the bacillus itself, but some ptomaine which rouses the tubercle bacillus to differentiated activity, seems in the present state of our knowledge the most probable, yet I am far from wishing to put wholly aside the possibility that the bacillus itself may exist in fish. We are only on the threshold of our knowledge of what is possible in these matters. I am, however, much less sanguine as to the discovery of the bacillus itself in fish than I was some years ago, and I must assert clearly that the failure to find it does not in any way invalidate the fish-hypothesis. The latter rests on general facts, and does not presume to explain details. It is right that I should add that several able observers—amongst whom Dr. Abraham, Mr. Cantlie and Dr. Ransom must be specially named—have advocated the opinion which I have here expressed, that leprosy is closely related to tuberculosis.

CHAPTER VI.

NO SPECIAL KIND OF FISH.

We may assume it as probable that it is not any particular species of fish which is to be accused of causing leprosy, for in its different habitats the kind of fish consumed varies very widely. The "bacalhao" of Spain and Portugal is usually dried cod from Norway and Newfoundland. The "stock fish" in Iceland is also cod, but in Zanzibar the fish often is shark, and in the mountains of Madagascar it is a species of perch. Probably the elements which cause the development of the lepra bacillus may be evoked by any kind of fish inefficiently dried or salted, long kept and finally eaten uncooked.

The question here arises whether, admitting that fish, under the conditions just referred to, is the common cause of leprosy, there may not be other articles of food capable of producing the same result. The Zulus eat caterpillars, the Chinese eat many articles which may reasonably come under suspicion, and in India periwinkles and various species of snails are eaten. Is it to the use of some of these foods that the occurrence of leprosy in communities which are reported to eat no fish is to be attributed?

To adopt such a supposition would be an easy way out of the difficulty. Whilst, however, admitting that it may possibly be the true one, I am bound to add that I do not think that it is. The disease is one of such special and emphatic individuality that it can have but one and the same cause. That cause is in nineteen-twentieths of its instances fish, and respecting the twentieth the inference is, I think, justified that despite defects in evidence it must still be fish.

If any other kind of food could cause leprosy we should expect to find local outbreaks of it in connection with well-known local peculiarities of diet. None such have been suggested.

A lamentable accident which occurred in India in connexion with inoculations for the prevention of plague, may, I think, be allowed to illustrate instructively what is possible in Leprosy. These inoculations were being practised, on a large scale, with a serum supplied in sealed flasks from Bombay. Apparently they were quite free from risk. Suddenly it happened that seventeen young men, all inoculated from the same flask, were attacked by tetanus and died. Careful subsequent enquiry made it certain that, in some wholly unexplained manner, the poison of tetanus had gained access to the flask. No other cases occurred. Now let us imagine the substitution for the contaminated flask of a parcel of cured fish containing the lepra bacillus and work out the possible results. The incubation period of leprosy is anything from a few months to twenty years. The lepra-infected fish might have been eaten by one person or shared among many—by a family or by half a village. What might be expected would be, that from time to time at very varying dates, one or other of those concerned would show symptoms of leprosy whilst their neighbours remained free. Some might possibly have left their homes and gone to distant parts, and might there very unexpectedly develope a malady not incidental to the locality. It will be objected that the lepra bacillus has never been found in fish. That is true, but neither had the tetanus poison ever been found in plague lymph, and it might perhaps be as reasonable to demand proof that it is an occasional ingredient of it, as to ask to be shown the bacillus in any single parcel of fish. It is possible that its occurrence is exceedingly rare. It may be that the contamination of the fish is usually effected by the ulcerated hands of a leper fish-curer and is an infrequent accident.

CHAPTER VII.

DE NOVO CASES AND THE INFERENCES FROM THEM.

A *de novo* case is to be defined as one in which neither inheritance nor contagion can have taken any part. It is obvious that the exclusion of these possible causes will often depend upon the statements of the patient and his friends, and that these statements are not by any means always trustworthy.

There may often be a motive for concealment of a family taint, such as in the case of insanity is well known to invalidate all statistical returns bearing upon this point. It is therefore open to those who believe in personal contagion as the one sole cause of lepra to shrug their shoulders and say, "We don't believe in *de novo* cases. The disease is due to a bacillus, and it follows as a logical deduction that it can only arise from the transference of that bacillus from some person who has it to some-one who has it not." It may be questioned, however, whether such extreme confidence in scientific dogma is consistent with sound and cautious reasoning. Do we know enough as to the life history of the bacillus which plays such an important part in the final consummation of the phenomena of lepra to justify us in asserting that in order to cause their production it must of necessity be transferred directly from person to person?

The search for *de novo* cases in countries where lepra is endemic is, as regards the natives, surrounded with fallacies. Where the disease is prevalent a person may have been unwittingly exposed to risk of contagion, and it may easily be the fact that he is not well-informed as to his ancestry. In the case of immigrants from healthy places, however, the suggestion of inheritance cannot be made, and in many instances that of personal contagion is exceedingly improbable. An adult Englishman going to reside in India is not very likely willingly to consort with lepers, nor seeing that contagion is admittedly difficult and to be effected only by very close association, is it at all probable that he could be exposed to risk without his knowledge. In the case of young children such risk may, it is true, be greater. Thus we get some of the best examples of *de novo* origin where lepra shows itself in persons of English birth who have resided in lepra countries. Respecting these it is simply the fact, and almost without exception, they are quite unaware of having even been exposed to contagion. "I have never, to my knowledge, seen a leper." "I have seen them in the streets, but I always avoided them." Such are the expressions constantly used. Is it likely that one and all of this class of our patients are in league to deceive us, and that if the truth were avowed they have been living with a leprous friend or servant in the house? Many of them are persons, be it remembered, of the most scrupulous cleanliness, and of purity of conduct in all respects.

During my investigations in Natal and Tembuland, to the questions "Have any of your relatives had this disease?" and "Have you ever seen anyone who suffered from it?" the answers were in most instances clear denials. It must be remembered also that these denials were often made in the presence of those who could have confuted them. At the same time in a great many cases, and indeed I think in all in which children suffered, there was an admission of family history, and often of exposure to risk of contagion. It was in the instance of isolated cases, occurring in adults, that these statements implying *de novo* origin chiefly occurred.

On Robben Island I chiefly confined my attention as regards these points to the white patients; partly because it was more easy to communicate with them, and partly because they were more intelligent and their statements more worthy of confidence. I was able also with them to make more satisfactory enquiry as to other possible influences, and more especially as to the eating of fish. In almost all cases the patient denied ever having seen a leper or having had any of his predecessors affected.

It is obvious that if a person becomes a leper in a place where leprosy is prevalent it is very difficult to assign the disease with confidence to any one special cause. According to the opinions of the observer, it may be attributed to inheritance, to contagion, to some article of food, or to the yet more general influences of the surroundings. All these are possibilities. If, however, none of the sufferer's ancestors have ever been known to be lepers we may then well nigh exclude the suspicion of inheritance, and if there has been no known contact with lepers that of contagion becomes improbable. It is, as I have explained, to cases which begin under unexpected conditions, and in the absence of any assignable influence, that the term *de novo* is applicable.

If these occur in countries in which the disease has been for very long periods quite unknown, they become very valuable as offering opportunities for search after the real causes of the malady. These are found under conditions which seem to make contagion impossible, and hereditary transmission improbable in very high degree. It may be admitted at once that well-established cases of this class are exceedingly rare. No leprosy has for long occurred in England to persons who have never left England, and the same statement is true of Inland Europe and of the United

States.* Nor perhaps does this fact discredit the belief in the fish-hypothesis so much as at first sight it may appear to do; although it may be thought that, if eating badly dried or salted fish were the efficient cause, we ought every now and then to encounter in non-leprous communities individuals whose peculiar tastes might have led to inordinate indulgence, and who had become its victims. A little consideration, will, however, make it sufficiently obvious that if in any country (as has been the case in England and Inland Europe*) the conditions of life (including the supply of food) have so radically changed as to secure the disappearance of a once prevalent malady, they are not unlikely to prevent its return in isolated instances. If they did not do so the instances would not long remain isolated, but the disease would again become fairly common. We must therefore, for the most part, on account of the extreme rarity of others, be content to examine under the head of *de novo* cases examples of disease which have originated without known exposure to contagion and without known inheritance, but yet in districts in which the disease is still to some extent prevalent.

Dr. Duhring, a very distinguished American observer, tells us that he visited an old-established leper home in the Riviera and found in it four patients. They all came from more or less adjacent districts, but no two from the same place, and they one and all declared that none of their relatives had been lepers, and that they had never seen anyone suffering from the malady.

Such cases may count as *de novo* in some sense, though not in a strict one. They originate in localities which formerly had many lepers, but in which the disease is dying out; and the important practical question is whether they imply the still persisting though much diminished use of salt fish, or the influence of atavic inheritance, or the unsuspected occurrence of contagion. The last is highly improbable, for if foci of contagion existed in the district, it is more probable that the relatives or neighbours of those who suffered should acquire the disease than those who had never seen or heard of them.

---

* With possibly a very few and somewhat doubtful exceptions.

Facts in all respects parallel with those just given are very common in all districts in which leprosy is a rare disease but still occurs occasionally. Almost invariably, under such conditions those who suffer are wholly at a loss to conjecture why they should do so. They have had no leprous progenitors, nor have they to the very slightest extent associated with lepers. It may be that the disease is receding in the district, or it may be that it is a new one and increasing, still the statements are the same, and its individual victims are isolated individuals who know nothing as to how they have got it. The same is true also of nearly all the instances in which well-to-do Europeans go to reside in leprous districts and acquire the disease.

In nineteen-twentieths of these cases inheritance is an impossibility, and in almost an equal proportion all history of exposure to risk of contagion is absent. "I have never been near a leper," "I have never even seen a leper," are the very common assurances which we receive.* That there has never been any familiar intercourse we may take as absolutely certain, for the subjects of such cases are often well-cared-for children, clerks, missionaries, or officers in the army.

In the case of a Swedish woman who was under care in the

---

* Dr. Henry W. Blanc, who recorded his experience at New Orleans, although strongly advocating segregation, wrote as follows respecting histories of possible contagion: "We have seen that a few of these cases are of inherited disease, but the majority give no such history. On the contrary, there is usually a flat denial of having ever seen or heard of a similar case" (page 62).

Liverpool Hospital in 1890, the evidence was that she had been born and had lived in or near Goteburg, and that she had lived largely on fish, both fresh and salted, but always cooked. Both her parents had died of lung disease, and she had no brothers or sisters. She had never known or seen anyone with leprosy. She had six children, and they, as well as her husband, were all healthy. This case suggests that tuberculosis inherited from parents may, by fish diet, be transmuted into leprosy in the offspring.

In the case of a Swede whose record is very carefully given by Dr. Duhring, although he had voyaged in leprosy districts it is definitely stated that he knew of no contact with lepers. The disease had not shown itself until ten years after his return from abroad. I might multiply such narratives indefinitely.

Even in Norway, where some present authorities are zealous to maintain that personal contagion is the only means of spreading leprosy, the admission is freely made that exposure to contagion is not unfrequently denied. It is alleged that such denials are not trustworthy, and that those who make them are not speaking the truth. This may in some instances be a not unjust imputation, but as regards the majority it probably is so. In some instances the locality in which the leper is found is at a great distance from any other cases, and intercourse not common. If we are to believe that in all these some accidental exposure to risk must have occurred, then it becomes obvious that very slight and temporary exposure may be efficient. But all evidence is opposed to such a belief, for if that were possible, why should not the whole community become lepers, and how could it be possible for nurses in asylums to escape? In South Africa the credibility of those who deny ever having seen lepers receives strong confirmation by the circumstance that it would have been exceedingly difficult for them to do so had they wished.

The disease is rare, and its subjects are scattered over very large districts.

The general trend of the evidence is then, I must believe, strong in support of the statement that a very large number of leprosy cases in all countries occur to those who neither inherit taint nor have been in any way exposed to possible risk of contagion. They are *de novo* cases, and as such they strongly support the creed that the disease in question may be induced by food.*

---

* I may support what I have said as to South Africa by a quotation from the evidence given before the Cape Town Commission.

As to the origin of the disease *de novo*, Dr. Todd was asked :—

(4065) "Do you think the disease ever arises spontaneously or *de novo ?*" "If you are to believe the statements of certain patients you cannot but come to that conclusion."

(4066) "Have you any records to the effect ?" "On the Island there is a considerable number of patients who state that they have never had connection with lepers at all, and have never in fact seen a leper."

CHAPTER VIII.

ON THE CONDITIONS UNDER WHICH LEPROSY HAS DECLINED IN CERTAIN COUNTRIES.

It is undoubted that many regions—whole islands, large portions of continents—in which leprosy formerly prevailed are now free from it. In others it has been much reduced, but has not wholly vanished. It is well worth our while therefore to ask under what conditions this decline has occurred.

We may take a simple example in the case of New Zealand. The Maori population of the northern island at the time of the arrival of Europeans had many cases of leprosy, although it could not perhaps be said to be extensively prevalent. In the early days a few European colonists suffered. Then the decline commenced, and for the last half-century the disease has been practically unknown in both races.* Now the conditions of the New Zealand population have changed very definitely under European occupation. The domestic animals in great numbers have been introduced, also cereals and root crops. In former times the Maori frequented the shore and lived on fish and fern roots. He now lives inland on beef and mutton, and has potatoes and wheaten bread. No leper house was ever formed, and not the slightest attempt at isolation was ever made.

In the island of Madeira the same changes under somewhat more complicated conditions are at present in progress. There has never been any compulsory isolation in Madeira, but for several centuries a home of refuge for lepers has existed in Funchal. At the present time it is a large well-maintained establishment with room probably for fifty inmates. As a matter of fact it had on December 9, 1901, when I visited it, only four, and one of these was not a leper. So entire is the abstinence from any attempt to restrain intercourse that it was suggested to me that the number was below the average because some had gone home to spend Christmas. Leper beggars may still be seen in the Funchal streets. There can, however, be not the least doubt that leprosy is on the decline in Madeira. Now the social influences have been an improved dietary of the labouring population. In former days salted or dried tunny was a staple article of food, and this fish was often, in the hope of selling it as fresh, kept until decomposition was commencing before any attempt at curing was commenced. At the present time Madeira is prosperous, and commerce has given her a market for her fruits and her fish. The tunny is now consumed in the fresh state, and the quantity that is "cured" has become every year less and less. Madeira has never exported her cured tunny, but has always almost wholly consumed it on the island.

---

* It may be that this is not literally the fact, for quite recently a medical observer believed that he had recognised leprosy in two Maoris.

The central parts of the continent of Europe may be mentioned as regions in which during the Middle Ages leprosy abounded, and which are now free. Professor Virchow, who investigated the subject, believed that there had been a leper house just outside every important German town, and the same was probably true of France and other adjacent countries. From all these, so far as inland districts are concerned, the disease has now wholly disappeared. It still "encircles Europe as a girdle," but it is unknown in the centre, and "the girdle" is a very slender and ragged one. Now it was in the days of Hildebrand, the palmy days of Roman Catholicism, when on two days out of every week fish was the only form of flesh food consumed, that this prevalence was attained, and it was in the two following centuries that its decline commenced. This decline was expedited by the relaxation of discipline which preceded the Reformation, and was consummated by the establishment of Protestantism. Simultaneously with the change in religion, social developments were also taking place which had for their general result an improvement in the dietary of the whole community. The most definite change of all, however, we may safely assume to have been the disuse of salt fish which had formerly been conveyed inland at considerable expense to meet the requirements of the fast days. It may also be suggested as very probable that improved methods of curing fish, the more abundant supply of salt, and perhaps some change in methods of cooking co-operated with the influences alluded to. That the disease was not stamped out by the lazar-house and the prevention of contagion, but that the real agency at work was of a much more subtle and all-pervading character I have endeavoured to show in another chapter. It is not necessary to repeat the argument here, but it may be useful to again say that it is inconceivable how a contagious disease should be wholly exterminated in all parts of a large continent by such measures of isolation as were then practicable.

Throughout England, Wales, Ireland, Scotland and the adjacent islands, the Hebrides, Shetlands and Orkneys, leprosy has been on the decline for five or six centuries, and during the last it has been non-existent. Let it be clearly recognized that the disappearance in these different localities has been uniform. It was not, however, quite simultaneous. The disease lingered latest in most outlying regions. Cornwall and the Shetland Islands had probably the last lepers. So lately as 1307 a Bishop of Exeter (Button) left by will bequests of money to no fewer than 39 leper houses which then existed in his diocese. Yet within two centuries of this bequest there were no lepers in Devonshire. It is beyond question, that, so far from the last lepers having been hunted out and relentlessly isolated, all precautions were for the most part relaxed when in consequence of its rapidly diminishing prevalence it ceased to cause alarm. That such would be the result in some districts at any rate, if not in all, we may feel quite certain. It is also on record that, in many instances, when the supply of leprosy applicants diminished, other afflicted persons, the blind and indigent, were received into the leper homes.

In no country was segregation compulsory, and many municipal records bear testimony to the fact that although towns were willing to protect themselves they took but little count of the risks incurred by the country districts. Lepers were driven out of the towns but were allowed to roam at freedom elsewhere. Admission to the leper house was a privilege which townsmen might claim but which in many instances was refused to non-parishioners. The desire to avoid the cost of the maintenance of such persons was felt in the same manner as is now the case under the poor law. Lepers were the first paupers for whom home and maintenance were provided, but even for them the charity of the day was not indiscriminate. As examples we may note that the records of Lyme Regis, in Dorset, in the sixteenth century record the payment of four shillings to a man that was a leper "to rid him." At nearly the same period the records of Selby, in Yorkshire, contain an order to a leper to leave the town within a certain period, without giving any instructions as to where he was to go. The clothes and other effects of a leper were in those days the perquisite and, in some instances at least, the valued perquisite, of those who had befriended him. No hint occurs that it was thought necessary to destroy them. It is needless to point out that these were not the conditions under which, if it had previously spread itself by contagion over the length and breadth of the land, it would be likely to die out. They are rather those which would be quite certain to perpetuate it. As to the other influences which were at work in the British Islands we may say they were similar to those which had prevailed on the Continent. With the exception of Ireland almost the entire population had become Protestant, and everywhere the supply of the better kinds of food had increased. With respect to Ireland the conditions were somewhat peculiar. The Irish had never been diligent fishermen, and the art of fish-curing had scarcely been pursued at all. The peasants were not wealthy enough to import much fish. The pig was the source of the main supply of their animal food. Leprosy had never been very abundant in Ireland, and it has been plausibly asserted that the introduction of the potato caused its final disappearance.

It is much to be regretted that respecting the smaller islands of the North Sea we have no well-detailed record of the changes which were taking place in social habits and supply of food during the centuries that they were ridding themselves of leprosy. It is known that the disease was at one time common in, probably, all of them, and from all it has disappeared. Feeble and irregular efforts at segregation were no doubt made in some of them, but it is certain that they were very inefficient. The islands in question no doubt shared in the general increase in prosperity of their larger neighbours, but if we could ascertain all the facts it is possible that something more definite in its influence might come into view. It may possibly be the fact that the importation of certain kinds of dried fish came to an end, or that changes in the methods of home-curing were introduced. The disappearance of the disease in the Faroës, whilst it still flourishes in Iceland

and Norway, supplies a most interesting problem for investigation. It was coincident with the abandonment in the Faroës of deep-sea fishing. To this statement of special instances it may be added that in almost all countries respecting which the history of leprosy in former ages is known, it appears to be on the decline. In all countries on the Mediterranean shore, with a few notable exceptions, and on the North Sea and the Baltic coast, it is now a rare disease compared with what it formerly was. Even in India itself, the accredited home of the malady, there is reason to believe that it is declining. In Palestine and in Egypt, its former homes, it is now rare. The influences under which this decline has resulted are those which have been already specified. In the great majority of instances no attempt whatever at segregation has been made. In all of them the disease still lingers, and it is worthy of note that it lingers in many different places, a few here and a few there, not in large numbers anywhere. A thousand foci for infective spreading exist at the present day on to the sea-board of Europe. From age to age the disease feebly maintains its gradually relaxing hold, but nowhere does it again reassert its strength. Concerning some other regions a very different story has to be told.

I may conclude this chapter by mentioning as an illustration of what is occurring in most parts of Europe that M. Théon, of Nice, in 1876 stated that leprosy was dying out in that district. He recorded that in the asylum at San Remo they used formerly to have forty lepers in the house sent from various places along the coast, and that now they have only six, and that the managers had now resolved to admit cases of ordinary skin-diseases into the leper hospital.

CHAPTER IX.

ON THE CONDITIONS UNDER WHICH IN CERTAIN COUNTRIES LEPROSY HOLDS ITS GROUND.

Norway and Iceland in the North of Europe, and Spain and Crete in the South, may be taken as good instances of places where leprosy still vigorously holds its ground. Respecting these and certain other places similarly circumstanced a few words must be said.

The west coast of Norway, in a district extending from a little south of Bergen to a little north of Trondhjem leprosy has always from the earliest period of history prevailed extensively, and it still does so. None of the earlier statistics are in the least trustworthy, but of late years very painstaking efforts have been made to collect accurate census returns. It is, however, much too soon to attempt to base upon them any conclusions as to the rate of its present decline, and it is much to be regretted that premature statements in this matter have been put forward and that they have been allowed to bolster up the segregation method of treatment. Correctly estimated they certainly do nothing of the kind.

For many years the medical profession in Norway has been energetic in its study of what may almost be described as its national disease, and our present knowledge of its nature has been largely the result of the labours of Bergen physicians. Leper houses have existed in Bergen, Molde, and Trondhjem for centuries. They have, however, been homes of voluntary refuge for the most part. Fifty years ago the belief prevailed that the disease was not contagious, but was maintained by hereditary transmission, and very praiseworthy efforts were made to induce its subjects to abstain from marriage and to become permanent inmates of these refuges. With this object in view the comforts of the homes were much increased in comparison with what they had been. It must here be stated that the prevalence of leprosy in Norway during the last century, and probably for much longer, has been somewhat peculiar. It has been strictly limited in its prevalence to the labouring part of the community; to the fishermen, boatmen and peasants. None of the middle-class inhabitants of Bergen or Trondhjem ever feared to contract the disease, although its victims sat about in their streets and sold their wares without restriction. Nor was it thought that any visitors to the beautiful valleys and fiords of Norway incurred the slightest risk of becoming lepers. Neither in the East nor in the West Indies is this immunity of the well-to-do observed, but in Norway it has been absolute, and the only exception to it which any of the investigators could ever quote was that of a German officer, of whom it was asserted that "he deserved the malady for he had degraded himself and gone to live with the fishermen and to do as they did." Now the fishermen-peasants of Norway lead hard lives. The extent of land suitable for cultivation on the shores is often of exceedingly limited extent, and even where the soil admits of gardening or husbandry the summer is a very short one. Cereals can be cultivated only with difficulty, and the products of the sea and those made from milk constitute the staple articles of the peasants' food. Of fish various kinds are taken in great abundance, and the drying and salting of it, both for export and home consumption, has for long been a most important pursuit. Bergen may, I believe, boast of the largest fish market and one of the largest leper houses in the world. From its wharfs are exported to Spain, Portugal and other countries large quantities of the dried and salted fish which is to some Roman Catholics almost a necessary of life. It must further be explained that the Norwegian peasantry do not, as a rule, like their fish fresh. They are accustomed to keep even what is called "fresh fish" immersed in water until it has become tainted and, to an English palate, disgusting.

Leprosy amongst the Norwegians has never been confined to the fishermen or to the immediate sea-border. It has prevailed also amongst the peasants in the mountain vales. This has been thought by some to be a fact in opposition to the belief that fish-eating is the cause of the disease. It must, however, be remembered that no part of habitable Norway is at any great distance from the fishing stations, and that the peasants referred to are precisely the class likely to take up salt fish to their homes. Almost all of them are indeed more or less migratory in their occupations, and are farmers in one part of the year and fishermen in another. There cannot be the slightest doubt that the inhabitants of Norway, as well inland as on the sea-board, have access to fish-food and use it freely. It is of much interest to note that from the south of Norway —the whole of the country adjacent to Christiania—as well as from the territories belonging to the adjoining nations of Sweden and Denmark, leprosy has almost wholly disappeared. It is precisely in the fishing districts of Norway that it has persisted, and there only. I cannot help again remarking that it is precisely in those countries to which the products of the Norwegian fishing industry are chiefly exported that leprosy still prevails (Spain and Portugal).

Up to a very recent time and possibly up to the present, rations of cured fish were parts of the regular dietary of the Norwegian leper homes. Another point must be mentioned, and it is this, that in some at least of the places where in Norway leprosy originates fuel is scarce, and thus the temptation to eat fish without cooking is increased by the pressure of necessity.

I do not know that anything of importance can be added to the picture I have tried to paint as to the present condition of the leprosy question in Norway. At the present the leading medical men of Bergen are eager to assert that the malady is a contagious one, and to infer that the measures recently adopted for enforcing isolation, to some extent at least, will soon effect its extermination. They are fain to admit, however, that during the long history of their leper-houses no instances of contagion to doctors, nurses, or other servants have occurred, and that the disease has always been confined to the peasantry. Further, it is the fact that the previous generation of medical men (who had before them precisely the same facts) did not believe in contagion. It was the discovery of the bacillus, and that only, which revived this creed. Should the belief that the disease is now declining with much greater rapidity than in former years prove well founded, as all earnestly hope that it may, it will still go but little way in proof that such result is due to segregation measures. These may after all be but the fly on the wheel, for Norway, like other countries, is sharing in the advance of civilization, and year by year her peasants are being better fed. From neighbouring countries under such influences the disease has disappeared, and although, in some districts, Norway is still, as regards the habits and food of her peasants, two centuries behindhand, we may expect that she will follow in the course of time.

The general facts as above stated in respect to Norway are true also for Iceland, for New Brunswick, for Minicoy, for the districts about the mouths of the Don and other large rivers, and on a smaller scale for several localities on the shores of the Baltic. In all these a large quantity of fish is obtained, and in all leprosy has flourished for ages, and still does so. In all it is for the most part the peasant-fisherman class which chiefly suffers. The position of things in Egypt is not much different, but here we have a history of very substantial reduction in the prevalence. In olden times leprosy was so common in the delta of the Nile that it was known as the "Egyptian disease," but in the present day visitors never become aware of its existence, and even some who have resided there for long have failed to become acquainted with it. Yet, in spite of the denials of many, there can be no doubt that amongst the poorer class of fellaheen there is still much leprosy. This class is still accustomed to consume much imperfectly cured fish. The two forms of religious faith in Egypt, Mahometanism and the Coptic Church, are both more or less adverse to fish-eating; the latter forbidding it on fast days, and the former encouraging care in the preparation of food in general. Were it not for these deterrents, leprosy would probably be far more common than it is.

In Spain and Portugal leprosy has been known from pre-christian times, and it still persists. In the present day it is met with chiefly on the north and south coasts, and it is almost unknown inland. It occurs, however, rather in certain districts near to the sea than on the coast itself. The explanation of this, which is a common fact in the history of leprosy, is probably that the peasants in these regions get only salt fish, whilst those on the coast eat it fresh. The influence of the fast days is however in all probability of great importance in perpetuating the disease. Much salt fish is imported from Norway and Newfoundland. On this point a medical observer, Dr. Donnet,* has recorded the following statement: "A very large quantity of salt codfish ('bacalhao') is yearly imported from Newfoundland, which from its cheapness is used largely by the people of Portugal. Besides this

* *British Medical Journal,* August 10, 1889.

salted cod, sardines, salted tunny, and other salted fish, are used likewise. All classes, rich and poor, among the Portuguese eat fish on Fridays and Saturdays throughout the year." It may be observed that in no part of Europe have attempts at the prevention of leprosy by segregation measures been carried out with so much energy as in Spain. In 1478, when the disease was most prevalent, Ferdinand issued at Valladolid a decree enacting "that everybody without distinction residing within the archbishopric of Seville and bishopric of Cadiz denounced and declared lepers must go to the Hospital de San Lazaro, Seville." At that time (and it is so even in the present) it was a feature in Spanish leprosy that it was not confined to the poorer classes. Princes and bishops were occasionally its victims. Thus we see that, whilst the greater part of Europe in the days when the fast-day regulations were relaxed rid itself of leprosy although segregation was scarcely attempted, Spain, which enforced it but continued rigidly to observe the fasts, failed to do so.

We may, I think, fairly take Norway and Iceland as affording good illustrations of the maintenance of leprosy in connection with the local production of fish and its excessive use as food, and Spain as affording an instance of the same result as a consequence of ecclesiastical ordinance. I must leave it to my readers to extend to other places the lessons which they teach.

CHAPTER X.

LEPROSY DOES NOT COMMONLY SPREAD BY CONTAGION.

In entering upon the question as to whether leprosy is or is not contagious, it is necessary to explain that the kind of contagion under discussion is that of personal association merely. We do not include under that term the eating of food which a leper's hands have touched, and by which the bacillus may be taken into the stomach. This kind of communication by contaminated food I freely accept, and in order to distinguish it from contagion by the breath or by touch, I have thought it well to call it "commensal" or food-communication. With it goes the possible conveyance of the disease by a leprous mother to the infant at her breast, this being also an instance of food-communication and not of contagion in the proper sense of the word. It is obvious that the measures to be adopted for the prevention of food-communication would be of different character from those needed to prevent "contagion," using the word in its ordinary sense. Risk from the one would be encountered only under exceptional conditions, whereas from the other it would be of constant occurrence in all leprous communities. It may be added that in all discussions in former times as to the contagiousness of leprosy, the word was used in the sense in which I now employ it. Until quite recently there has never been any attempt to make the distinction which is now demanded. In denying that there is any good reason for believing that leprosy spreads by contagion, it is very desirable to have it clearly recognized that what is meant is, that there is no danger from consorting with lepers, provided care be taken not to receive food from their hands. The touch will not convey it, nor will the breath, nor will the clothes worn by a leper. With this explanation I may now proceed to examine the facts as to whether leprosy is communicable by contagion.

In all ages and in almost all communities in which leprosy has occurred there has been dispute as to whether or not the disease was contagious. We need not wonder that untrained observers, in lands in which it was common, noting that not infrequently several members of the same family were affected and that the malady was often attended by open sores, jumped to the conclusion that it must be communicable. Our literature is full of allusions to the prevalent belief in this possibility, and horrible have been the cruelties which have resulted from it. Yet, in truth, the belief has almost always been held with misgivings, and the precautions which might naturally result from it have constantly been neglected. Different, indeed, from what is usually the case with such diseases as small-pox and plague, family affection has in the case of leprosy almost always prevailed over fear, and wherever attempts at compulsory isolation have been made, the relatives of the sufferers have been found willing to encounter any risk that there might be in concealing the victims in their homes and resisting their removal. Even in communities but little instructed in medical knowledge, observation of facts has frequently led to explicit disbelief in contagion. Not infrequently the origin of the disease, in countries where it is not common, has appeared so obscure that it has been attributed to witchcraft. Thus Livingstone relates that when the chief Seketo became a leper he caused a number of his captains to be executed, in the belief that they had exercised the arts of sorcery. This belief is still common in South Africa and in many other countries, and may fairly be cited as proof that those who entertain it have no strong suspicion as to contagion.

If we turn to the belief which has impressed itself upon more skilled investigators, we shall find that from the time that modern medicine took cognizance of leprosy the prevailing creed of the profession has been that it is not contagious. In 1866, at the request of the Government, the Royal College of Physicians of London made a very extensive enquiry throughout the British dominions, and came to a clear conclusion that the disease did not spread by contagion.* A similar result was arrived at by the Indian Commission which was appointed under the committee of the "Prince of Wales' Leprosy Fund." This second verdict, given after an interval of a quarter of a century, is the more important because in that interval an important discovery had been made. In the year 1871 a Norwegian physician, Dr. Hansen, as the result of laborious microscopic research, ascertained that in all cases of true leprosy a bacillus is present and takes a large share in the evolution of the phenomena. This unfortunate discovery threw back for a quarter of a century the investigation of leprosy. It put investigators on a wrong scent, and it suggested a false conclusion. "And yet the light which led astray was light from Heaven." The discovery was a real one, and although it has had the effect of re-instating for a time the otherwise discredited doctrine of contagion and of leading to the neglect of the really profitable lines of work, yet in the future it will no doubt help us to a definite solution of the question. The error lay in the hasty assumption that the presence of a bacillus necessarily involved personal contagion and excluded everything else. Now although it may be true that modern science knows nothing of spontaneous generation, and that it is safe to assume even of the very lowest forms of life that they must have had parents like unto themselves, yet it is also true that our knowledge as to the possibilities of the metamorphic changes of these organisms, their indefinitely protracted periods of rest, and the conditions under which they may enter into close symbiotic union with the living tissues of the higher animals is not as yet far advanced. In these possibilities there may be present that which for practical purposes almost amounts to spontaneous development.

---

* See "Report on Leprosy by the Royal College of Physicians," sold by W. H. Allen, Waterloo Place, 1867, an invaluable collection of facts and opinions as observed and held prior to the discovery of the bacillus.

There followed on Hansen's discovery a widespread and very confident re-assertion of contagion-doctrines, and logically a corresponding desire to enforce what seemed the only efficient measures for the extinction of leprosy. All other suppositions were somewhat contemptuously thrust aside. In their enthusiasm for the new science of Bacteriology men forgot that, after all, the question as to whether any given malady is or is not transferable from one person to another must be ascertained by careful observation and well-conducted experiments, and they assumed that all doubt had been for ever removed. The question of fact, however, remained of course just what it had always been, and none other.*

---

* I find that I wrote as follows after a visit to Norway in 1869 :—"The opinion of most of those with whom I conversed was that poor food, uncleanly habits, and extreme hardship in the way of exposure to weather, are the real causes. All admit that it is transmitted hereditarily, and *all deny that it is contagious*; some believe in hereditary transmission so strongly as to hold that at the present day it is almost the only cause. Against this notion, however, we have the fact that leprosy can be produced in immigrants who have come from districts which are exempt, and who are of perfectly healthy families. These instances are few in number, but they are undoubted. Dr. Bidenkap mentioned to me several, and one in which a very short residence in the Bergen district had sufficed. I hope he will be induced to publish full details of this last, as it is certainly very exceptional. At Bergen I found all authorities, and Dr. Danielssen especially, very unwilling to

I will now endeavour to state as briefly as I can some of the principal facts which appear to show conclusively that, under ordinary circumstances, leprosy is not capable of spreading by direct contagion from one person to another, and that the sole mode of its communication is by food.

We have at present in London many lepers. They are all imported cases. The nature of their disease is usually carefully concealed, often even from the patient. These persons associate with their friends, &c., without restraint or any special precautions. If schoolboys they go to school, if clerks to their offices, and if married they continue to live with their consorts. The disease never spreads.

The statement which has just been made as to lepers in London is true also of Paris, Berlin and Vienna. Into all these capitals—more especially into Paris—exotic lepers find their way; and we have the explicit statements of those under whose observation they fall that no contagious spreading ever occurs.

The migration of Norwegians to the United States of America has been for long very large. At one time it used to be asserted that there were more Norwegians in the States than in all Norway. Now the Norwegian peasantry at home suffer much from leprosy, and many lepers have found their way across the Atlantic. There they have been for the most part unrecognized, and they have mixed, without precaution, not only with their own friends but with others. In no single instance has any contagion occurred; no leprosy foci have ever been established by them in the States.

There is probably no large hospital in London or any European capital which would hesitate to admit a leper

admit that leprosy could easily be induced in immigrants, and the fact that such instances are rare was illustrated by the circumstance that the same case was mentioned to me by several different surgeons."—See *Medical Times and Gazette.*

into its general wards, or would insist on any special precautions against contagion. In London and Paris such cases are constantly so received into hospitals, and without any ill results.

In thousands and thousands of instances, and in all countries, leprous husbands or wives have continued to live with their consorts through long series of years. Of course in some instances it has happened that husband and wife either simultaneously or in succession became lepers. It is, however, very exceptional for both to suffer, and it does not occur at all more frequently than might be expected from the known prevalence of the disease in the district, and from the fact that the two must live under much the same conditions as regards food. In Europeans who contract leprosy, I believe that it has never once been recorded that both husband and wife suffered together.* If leprosy were a contagious disease that occurrence ought to be frequent.

If leprosy were a contagious disease it would never die out from a community excepting under conditions of the most strict isolation. Such conditions have never been obtained, and are in fact impracticable. In many regions from which leprosy has disappeared they had never been even attempted.

If leprosy were a contagious disease no explanation could be given of its scanty prevalence in many communities in which every possible facility for such communication is afforded.

If leprosy were a disease spreading by contagion, no explanation could be given of its local distribution. Very large districts—in fact by far the larger part of the world—are entirely exempt, whilst others suffer severely. Of no really contagious disease can this be asserted, unless indeed its prevalence has evidently been restrained either by natural or artificial agencies.

---

* Doolittle, in his "Social Life of the Chinese," states that "it is a popular saying that if either a man or his wife has leprosy the other party will not take it."

The case of Father Damien had great influence in impressing popular opinion in favour of contagion. Everyone heard or read of it, and everyone believed that the devoted priest had, in the course of his zealous ministrations in a leper home, acquired the disease by direct contagion. The facts are, briefly, that leprosy from some then unrecognized cause was very rapidly increasing in the Sandwich Islands at the time that Father Damien went to reside there. He submitted himself to the influences then prevailing which were causing the outbreak, and he became a leper. If it was the food which the people were eating which caused the disease, then as Father Damien took the same food he might derive the disease from that source. If the disease was spreading by contagion then undoubtedly he ran that risk. I have elsewhere given reasons for believing that it was the institution at Honolulu, by European immigrants, of a factory for curing fish which caused the outbreak.

In connection with Father Damien it may be well to repeat what I have already said, that in countries where leprosy prevails it is beside the mark to attempt to collect proofs of contagion. In such countries it is impossible to avoid the fallacy that the person who is supposed to have acquired the disease from associating with a leper may also have eaten the same kind of fish. There is no place in the world in which the disease is really prevalent where fish-eating is not also general, and, under such conditions, it is obviously not reasonable to assume, when there has clearly been exposure to both kinds of suggested risk, that the result was certainly due to either one of them. Under such conditions we can only balance probabilities. Yet the medical literature of leprosy, as written by contagionists, is full of worthless "evidence" of this kind. Instances are given in which a master by inadvertence handled a tool which a leprous servant had been using, or in which a gentleman had been in the habit of taking the reins from the hands of his coachman, who, although not at the time suspected, subsequently showed the symptoms of leprosy. I am not quoting imaginary cases, for both these instances have recently been adduced as affording proof of contagion, and as instances in which, unless carefully sought for, the source might easily have been overlooked. Both occurred in places where leprosy and fish-eating are fairly common, and it is obviously possible that both master and man in each instance might have partaken of the same supply of salted fish. This suggestion must be allowed to apply to all regions where, as implied by the prevalence of leprosy, the quality of the fish is open to suspicion. But there are plenty of places where, from the entire absence of leprosy for many generations, we cannot suspect the fish market. It is in such only that proofs of contagion can be reasonably sought for. Much evidence has already been adduced in proof that in them for the most part nothing in the least suggestive of contagion ever occurs. We have seen that lepers from the tropics come in considerable numbers to reside in Paris and London and elsewhere, and that although there is no enforced isolation the disease never spreads. But are there no exceptions? Yes, there are a few. One of these has been quoted over and over again by every advocate of the possibility of personal contagion, and we may fairly assume that it is almost the only one which they can find. The case to which I allude is that well known to all leprologists as "Dr. Hawtrey Benson's case."

Dr. Benson's facts were as follows: An Irish peasant who had been abroad and had lived in leprosy districts, developed the disease some years after his return home. He lived in his cottage with a brother, and after an illness of some years he died. His brother had slept with him, and after his death wore his clothes. Some time after the leper's death this brother, who had never been out of Ireland, developed symptoms of the disease, and after an unusually short illness died. No other cases occurred. Both patients were taken by Dr. Benson to Dublin, and were produced before a Medical Society. The case has been assumed to prove that infection by the skin (from the clothes) is possible.

It is no part of my argument to prove that the bacillus of leprosy can under no circumstances be transferred directly from one person to another. On the contrary, I think it highly probable that with proper painstaking this transference might occasionally be accomplished. My contention is that such transference is very unusual, and that it is so difficult that we may, for practical purposes, regard leprosy as not contagious. To this conclusion I feel sure that the facts very definitely point.

It might perhaps be sufficient in order to establish my point to again remind the reader that the case quoted stands almost alone. It is almost the only one in the whole history of European leprosy in which the introduction of a leper into a non-leprous community is supposed to have been attended by ill consequences. It is necessary to restrict this assertion to European experience, because amongst less civilized communities a certain small number of parallel occurrences have taken place. During my journey in Natal I did come across several cases in which Kaffirs, who were supposed to have contracted leprosy in Cape Colony, had returned home and had apparently communicated the disease to members of their families who had never left their kraals. These cases were very few in number, and for the most part those who suffered were children. My explanation was that in all probability the hands of the leper having come in contact with food had been the means of communicating the disease. The Kaffirs are notoriously careless feeders, and constantly use their fingers where those more advanced in civilization would employ knives and forks. If the disease were really contagious it would very soon have spread widely through these crowded communities, for not the slightest precautions are taken. It has not done so, and to this day leprosy is exceedingly rare in Natal, affecting only here and there one or two, and always under conditions making commensal communication probable. The same reasoning is quite applicable to the Irish case. It is not at all improbable that between the two brothers, living in the same cabin, opportunities of food contamination might have occurred. The mere possibility of it is sufficient to destroy the value of the fact as proof of any other kind of communication.*

It would fill a whole volume if I were to attempt to quote or to summarise the innumerable statements of authorities who have denied the contagiousness of leprosy. I have already incidentally referred to some of them, and shall not here do more than cite a few extracts, taken almost at random, which bear out what has been advanced in the preceding chapters :—

---

* It is of interest to note, in connection with Dr. Benson's case, that at a medical meeting in Dublin at which the case was brought forward, one speaker mentioned having seen several other examples of leprosy amongst the Irish peasantry, which had apparently arisen spontaneously. In none of these had it spread to others, nor did either of Dr. Benson's two patients spread the disease, although no measures of isolation were enforced. It is sometimes alleged by opponents of the fish hypothesis that, if it were true, the Catholic peasantry of Ireland ought still to suffer from the disease, since they still observe fast days and, it is said, consume badly-cured fish. For my own part, I do not believe that any considerable number of the Irish peasants would in the present day eat decomposing fish, and it is the fact that leprosy did linger longer in Ireland than in England, and that more instances of spontaneous origin are alleged to still occur there than in any other part of the British Islands. If this could be proved it is obvious that it would give valuable support to my contention, but I am bound in candour to state that I do not feel quite sure of the facts. The cases reputed to have been leprosy may have been so named in error.

Leprosy is common in Havana, and for more than two centuries there has been a leper house. It was supposed to be diminishing until the Chinese immigration, and then increased. Dr. Arango, in 1892, stated that he had never known a case which could be traced to contagion, and he knew of persons who had lived twenty-eight or thirty years in the home without contracting it. The only official out of twenty-five who during twelve years had become a leper, was a chaplain.

To this statement of the immunity of officials may be added the fact that a certain number of cases of elephantiasis (not leprosy) were always in the home mixed with the lepers. None of them had ever taken it.

The Memel doctors do not believe that it is contagious, but that it is caused by food, &c., which is mainly fish.

Against the belief in contagion the evidence of Dr. Olivade, of Madrid, is strong. He is not an anti-contagionist, on the contrary, he remarks that the disease "ought to be contagious and inoculable." Yet he avows that during an experience of twenty-five years he has never known an instance of contagion, and that out of 500 lepers whom he had interrogated only one suspected contagion as a cause. There were always six or eight lepers in the Madrid Hospital, and no nurse or other person in attendance had ever contracted the disease.—E. B. 125.

There is a memoir on "Leprosy in Syria," by Dr. Wurterbeit, in the *British and Foreign Medical Review* for 1873. It is a learned article. Respecting contagion he writes : "I have put the question to many lepers whether there was any reason to believe that they had contracted the disease by contagion of any kind, and they were all positive in denying it. One of them expressed himself in this way : 'I saw but one leper in my life, and I never came near him.' I know instances of lepers' wives living with their husbands a number of years, and never gave it to them, and *vice versâ.* I saw a leper Jew in Damascus who lived four years with his first wife after the disease had fully declared itself. She obtained a divorce and left him. He then took a second wife, whom I saw. She had been living with him about four years also, and was quite free from the disease."

The great Norwegian authorities, Drs. Danielssen and Boeck, wrote: "Among the hundreds of lepers whom we have seen daily, not a single instance has occurred of the disease spreading by contagion. We know many married persons, one of whom is leprous, cohabiting for years without the other becoming affected. At St. George's Hospital (Bergen) many of the attendants on the inmates have lived there more than thirty years and are quite free from any trace of the disease. As the result of our observations, *we have only to deny the contagiousness of leprosy*." (See "Rep. Roy. Coll. Ph.," 1869, lxix.)

Colonel Lee, in a report on leprosy in the Madras Asylum, has incidentally mentioned 148 couples in which the husband was a leper and the wife healthy, and 43 in which the wife was a leper and the husband healthy. In only two instances were there no children, and the average was five children in each family.

Writing in 1875, Dr. Tilbury Fox and Dr. Farquhar said that they saw no reason on the score of contagiousness why lepers should not be admitted into our general hospitals for treatment.

Drs. Lewis and Cunningham stated that the history of the asylum at Almora gives no support to the doctrine that leprosy is a contagious disease, but strong evidence to the contrary.

J. Vandyke Carter, as quoted in the *British and Foreign Medical Review*, vol. lx., 1877, arrived at the conclusion that "Its attacks result so little from contagion that only about one per cent. of 855 cases of cohabitation between a leprous husband and healthy wife, or leprous wife with healthy husband, resulted in showing leprosy in both husband and wife."

Dr. Planc, Commissioner for the North-West Provinces, wrote in the above *Review* that practically the Indian population did not believe in contagion.

I quote from the *Dublin Journal of Medical Science* (vol. xciii., 1892), the following:—

"The *New York Medical Record* of November 7th contains a valuable paper on leprosy by a medical missionary stationed in Madura, Southern India—the Rev. Dr. Frank van Allen. 'To one,' he says, 'who has observed leprosy carefully, the opinion must be irresistible that the great majority of the human race are entirely safe, though associating daily with lepers.' Again:—'It is almost absolutely certain that the great majority of the human race cannot contract the disease by contact however free.' He cites the experience of the Madras Leper Hospital which shelters over 250 patients: 'Most of these are in a condition to require daily dressing of their ulcers. Three dressers are here employed for this purpose. The dressers use the naked hands in doing this work, handling and rubbing the ulcers most intimately. One dresser has been employed in this work for twelve years, another ten years, and another five years. None of them have contracted the disease.'"

I may briefly sum up as follows, at the risk of some repetition, the reasons for disbelief in contagion:—

That experimental inoculations (with the single very doubtful exception of the Sandwich Islander Keanu) have always failed.

That it is universally admitted to be very infrequent for husband and wife to be both lepers.

That whilst leprosy in most countries where it occurs is of widespread prevalence, it is rarely very common.

That in many countries it has existed from century to century without material increase (Ceylon, India, Burmah, &c.).

That with rare exceptions nothing in the least approaching to epidemic prevalence is ever observed.

That in many communities in which leprosy occurs large sections of the population are constantly almost wholly exempt.

That the attendants in leper asylums never contract the disease.

That lepers residing in England, France, or the United States at the present day never become foci from which the disease spreads.

That on the supposition of contagion it is impossible to explain the fact that the disease died out in England and many other places from which it has disappeared. Not only is it certain that there was no systematic or efficient segregation, but it is on record that when the leper hospitals could no longer be filled, other persons—the blind, crippled, &c.—were admitted into them.

That although, as might be expected, in many countries and at different times popular opinion has been in favour of contagion, in many others it has been strongly the reverse.

That at present in India lepers mix freely with others, and attend as out-patients at hospitals without the slightest repulsion being shown, yet the disease is thought to be decreasing rather than otherwise.

As opposed alike both to contagion and heredity it may further be alleged:—

That when leprous communities are removed to a distance from the place of origin the disease dies out.

That when individual lepers are removed to non-leprous places they do not convey it either to their associates or offspring.

That when the social conditions of a leprous district are changed the disease dies out of itself.

CHAPTER XI.

ON DIFFICULTIES IN THE RECOGNITION OF LEPROSY.

It is an article of popular belief that leprosy is a disease which labels its victims so conspicuously that anyone can recognize them. It is upon this supposed fact that those rely, who still think that in the Middle Ages all lepers were discovered and at once consigned to the lazar home or compelled to carry a rattle. Clearly it could only have been by the most prompt adoption of such measures that a contagious malady could be stamped out. The truth, however, is much otherwise. So recently as 1812 an anæsthetic leper was under care in the London Hospital, and his case was taken by his physician, Dr. Yellowlees, before a meeting of the Royal Medical and Chirurgical Society. His symptoms were studied with great care, but from first to last neither Dr. Yellowlees, nor any other member of one of the foremost medical societies in the world, had any notion as to the real nature of the malady. The patient was a Scotchman, aged 58, who had lived many years in Jamaica. He was supposed to be suffering from "an exceptional form of anæsthesia." This case is only one among many which might be adduced in illustration of difficulty in the recognition of leprosy. At this date the disease was extinct in Britain, but here, obviously, was a good opportunity for its re-introduction, and no doubt there were many such. It may be granted that the failure to recognize occurs chiefly in nerve cases, and that these are, according to the creed of the contagionist, much less dangerous than are the tuberose. It is, however, only a question of degree, and where compulsory laws exist these are isolated as rigidly as others.

In London during quite recent years several cases have occurred in which those well qualified to judge have differed in opinion as to whether the disease was leprosy or not. It is therefore, I must contend, idle to profess that it would be possible under any conditions whatever so effectually to segregate all lepers as to prevent the disease, if it were contagious, being perpetuated by contagion. I quote the following from a report of the Cape Colony Commission (see Vol. II., page 45):—

"Leprosy, except in the more characteristic and well marked forms, is a disease exceedingly difficult to recognize; in some cases in the earlier stages the disease becomes dormant, the eruption disappears for even a year, and the disease is for the time not clearly, if at all, recognizable. Under these circumstances mistakes have been made, and doubtful cases have occurred, where medical men have differed in their opinions as to a person being a leper or not; while a person having been declared a leper by a district surgeon and admitted to Robben Island has been pronounced 'clean' by the island medical staff and, on the other hand, a medical board have declared him to be a leper.

"Moreover, on the island itself, the opinions sometimes clash; the surgeon-superintendent states a person to be 'clean,' while the assistant surgeon regards him as a leper. And it is in evidence, notwithstanding obtaining a second, even a third, or fourth, fifth, or sixth certificate before sending a patient to Robben Island, persons have been subjected to long periods of confinement who were not lepers at all."

It is not by any means infrequent for one or more quite local patches to precede the general eruption. Sometimes a single one may have been present for a year or more, and steadily spreading at its borders before others are observed. Those who believe in contagion by touch or by clothes may suggest that in these cases the first patch marks the site of infection. It is, however, far more probable that these local patches are simply the first drops of the threatened shower, and that they are due to the presence of the bacillus in the blood. They are never associated with any history of injury, and they occur as a rule on parts well protected by the clothes. Precisely similar phenomena occur also in connection with the nerves. Paralysis of one ulnar or one external tibial nerve may be present for a year or more before any other symptoms of leprosy can be discovered. It is obviously impossible that direct infection of the nerve trunks can have occurred. It is, however, highly probable that these earlier lesions are attended by local multiplication of bacilli and further supply of infective elements to the blood. In a large majority of cases the initial symptoms are bilateral, but it must always be remembered that the earliest stages are very insidious in their development, and may easily be overlooked. Careful examination will very often discover patches on the skin so inconspicuous that the patient had not recognized them. A slight discoloration or a little numbness may be all that characterises them.

If it be true of the external and objective conditions which reveal leprosy that they are often very indefinite, and may be for long periods but slightly marked, it is yet more so of those which imply general disturbance of health. Although many writers have been at much trouble to describe introductory symptoms, it may be reasonably doubted whether there are any such. Undoubtedly the disease may commence and run a considerable length in those who believe themselves in excellent health. When the nerves are affected, "rheumatic pains" in association with tingling and numbness, are often complained of. It is rare, however, for there to be any material pain, and from first to last leprosy as a rule is unattended by suffering. During the greater part of its course, in a considerable majority of cases, the patients continue to be quite capable of enjoying life and performing its ordinary duties. Depression of spirits is rare unless the disfigurement be great or the patient have fallen into the clutches of a compulsory isolation law. Under the latter conditions a state of despairing apathy usually results from which it is impossible to rouse the sufferer. To this fact the authorities on Robben Island bore abundant testimony. They told me that it was impossible to induce their prisoners to take interest in anything.

It is probable that in some cases the nerves are attacked before the skin and independently of any affection of it. Thus nerve trunks which pass in positions exposed to injury, as the ulnar at the elbow and the anterior tibial where it winds round the neck of the fibula, are remarkably prone to suffer, a fact which cannot be explained on the suggestion of primary skin affection. In the case of the facial nerve (which is frequently attacked), we have a motor nerve which could not well be infected from the surface. Some authors have supposed that the nerves are commonly, if not invariably, affected first, and have tried to trace the location of the patches on the skin to nerve distribution. This, however, is an untenable doctrine. I have never in any single case seen the skin patches arranged as if in connection with nerve distribution (as we see them so commonly in herpes zoster and in morphœa). Even the vesications which occur on the hands, and which are usually attributed to nerve influence, may be, with more likelihood, supposed to be caused by accidental exposure of the non-sentient parts to fire-heat or sun.

I may suitably quote as illustrating my present topic, two cases which I investigated during my tour in Cape Colony.

At Malmesbury (Cape Colony) Dr. Roux was good enough to show me a case of much interest in reference to obscurity of diagnosis. He had himself entertained no doubt that the patient was leprous, but examination of the blood at the Bacteriological Institute had failed to detect the bacillus. The subject of the case was a dark-skinned, well-grown lad of 14, whose father was a German and mother a Hottentot. He was an orphan, and nothing definite could be ascertained as to family history. He had been brought up at a farm, and he told us that he had regularly eaten salt fish for breakfast and supper.

This boy had in the first instance been brought to Dr. Roux because a certain area on the outer part of his left thigh was numb. The part showed scarcely any trace of morbid change, being only doubtfully mottled. The loss of sensation on pricking with a pin was, however, definite. There being no other symptoms, the blood was twice sent to Cape Town for examination. It should be stated that the boy's elder brother, several years older than himself, had died of leprosy.

The boy, having been stripped and placed naked before me, my attention was first drawn to a number of little white spots scattered over the trunk. These were, Dr. Roux assured me, only the scars left by chicken-pox, and a usual condition on dark skins. For some time, the light not being very good, I did not notice any patches, but finally, after observing him in several different positions as regards the way in which the light fell, we both of us felt certain that there were large abruptly margined areas of a paler colour than the rest, which extended symmetrically over the buttocks. Above these were also some smaller patches. These were only partially anæsthetic, and not nearly so much so as the less definite patches on the outer sides of the thighs. These latter were symmetrically placed, for, although the left thigh had taken precedence, an area on precisely the same part of the other thigh had recently been formed. There was, we both of us thought, definite thickening of both ulnar nerve trunks, but no subjective symptoms had been produced by it, and the hands were normal, and neither painful nor numb. Excepting what have been mentioned, the boy had as yet no symptoms of leprosy; there could, however, be no doubt as to diagnosis. It will be seen that both food origin and personal communication were possibilities.

We examined the above case in Dr. Roux's consulting room on the morning of February 26th, 1902. Later in the day Dr. Roux showed me at the Court House another lad, who had been brought from the country on a magistrate's order, for my inspection.

The subject of this second case was, like the above, a young lad who had had leprous relatives, and who had also eaten salt fish regularly. He was 14 years old, and his father had died of leprosy. He had been under Dr. Roux's observation for several years on account of definite symptoms, but a peculiarity of his case had been that his ulcers sometimes healed under iodide of potassium, and this had led to other suspicions, which, aided by the natural reluctance of a kind heart to consign a happy-tempered boy of bright intelligence to a life-long prison—had saved him from transference to Robben Island. The lad lived at a mission station farm, and it was not known that there were any other lepers near him. He was well cared for.

The eruption present in this case differed from that in the preceding in that it was much more conspicuous. It exactly resembled leucoderma. Large abruptly margined patches had spread upwards from the buttocks over the loins, just as was threatened in the other case. In addition to these there were similar patches on other parts of the back, on the shoulders chiefly, and thighs. They were in most parts arranged with almost grotesque bilateral symmetry, but there were some exceptions. In addition to these leucoderma-like patches, there were many scars on the legs, arms and feet, thickened patches on the elbows and front of knees, and a few open ulcers. The little and ring fingers in both hands were wasted and contracted ; there was the ulnar nerve hollow, and the ulnar nerve trunks were very much thickened. The face was definitely without expression on the left side, and he could neither frown nor whistle. He could, however, shut his eyes, and I was assured by Dr. Roux that the signs of paralysis were less than they had formerly been. There was no eruption on the face, nor any trace of swelling. Both feet and hands were more or less numb, and so were the white patches, but sensation was not wholly lost anywhere.

Although the case was undoubtedly a severe one, and there were open sores, I yet ventured to plead for this poor boy that he might not be sent to Robben Island. I quoted

Dr. Hansen's opinion as to the efficiency of home segregation and cleanliness, and urged that he should be told not to eat salt-fish, and warned that he must not touch the food of others, and that he must keep himself apart from other children, whilst those in charge of him should be directed to dress and cover all sores most carefully, and to allow him a liberal meat diet. With such means I felt confident that the risk run by others would be infinitely small, and that the probability of arrest of the disease in the patient not inconsiderable.

CHAPTER XII.

LEPROSY IN RELATION TO RELIGIOUS CREED.

In not a few instances the ordinances of religious creeds have descended in some detail into the regulation of the food of their communities. Thus to the Israelite and the Mahomedan, amongst other articles, the flesh of the pig is strictly forbidden, and to the Brahmin permission is denied to take the life of any animal. In some instances these prohibitions have been based upon knowledge, or prejudice, as to the wholesomeness of the thing concerned, and in others upon deeper humanitarian or psychological conceptions.* Whatever may have been their motive, their practical application has had as one of its results the furnishing to the investigator as to the influence of different articles of food, not unimportant material on which to base his conclusions. Thus, if any given disease is found to be as common amongst Jews and Mahomedans as amongst others, he may feel sure that it has other causes than the use of pork. It is, however, obviously necessary that he should exercise discretion in his deductions, for it by no means follows that because an article is forbidden it is invariably avoided. Many followers of Mahomet will drink wine, and it is rumoured that Jews may be found who will eat oysters or even sausages. Conscience often plays us sad pranks, and where the temptation is strong, as in the case of food it often is, various subterfuges may be had recourse to. A man forbidden to take life, or to eat anything that has been killed for food, may feel at liberty as regards that which has died a natural death, or that which has been so altered that it no longer looks like any living thing.

---

* To Mr. Arthur B. Briant I am indebted for the information that many Egyptian inscriptions prove that fish-eating was held by certain classes to be an abomination. King Piankhi (750 B.C.) refused to admit the princes of the Delta because they were fish-eaters, and the symbol of a fish was used to express disgust in inscriptions of a far earlier date (Ptāh-hoteb, 3366 B.C.).

It is undoubted that the poorer classes in Egypt were always great eaters of fish. Some of them are so still. The Israelites in the desert "remembered the fish that they did eat in Egypt." The inhabitants of deltas are almost always fishermen and great eaters of fish, and almost invariably they suffer from leprosy.

We are concerned here almost solely with one article of food, namely fish. It may be well, however, to point out in passing, that the experience of the Jews (in many countries remarkably prone to leprosy) makes it exceedingly improbable that the disease has any sort of connection with the eating of swine's flesh, and we might, if it were worth while, extend the same argument to certain other articles of food.

Respecting fish in general it may be plausibly alleged that in popular estimation fish hold a sort of midway position between animals and vegetables. They are cold-blooded, and they exist under somewhat hidden and mysterious conditions, which would be fatal to most other forms of animal life. It is not necessary to kill them, they die of themselves if taken out of water. No one, however tender-hearted, feels much compunction at being the cause of the death of a fish. Their flesh differs very conspicuously from that of warm-blooded animals, and is generally supposed to approach that of vegetables in mildness and delicacy. Thus it may easily be the case that those who profess a religion which forbids the taking of animal life may not be always punctilious in reference to fish, more especially if its death have been caused by accident or by other persons. These considerations may be accepted as suggesting that we should not receive too readily the fact that a creed forbids the use, as food, of that which has enjoyed animal existence, as implying that those who follow it do not eat fish. There is, however, another direction in which religious creed comes into yet more influential relation with the supposed causation of leprosy by eating fish. The Roman Catholic Church, basing its action probably on the supposed approximation of fish food to vegetable food, has for a long series of centuries permitted the use of fish on fast-days. Although on these fast-days the eating of fish is in no way enjoined, yet as all other kinds of flesh-food are prohibited the result is almost the same, and a very large and important demand for fish is thus artificially created. Nor is there any cognizance taken by the Church of season. The fast-days continue to recur all the year round, and thus the demand is constant, whilst during long periods no fresh fish can be obtained. The demand also exists in many regions in which at no period of the year is the supply of fresh fish large. The fast-days comprise, even for the less strict, one day out of every week and several weeks at Lent, whilst for those more willing to practice self-denial a much larger portion of the year is so engaged. The practical result of this has been an enormous development of the trade in salted or dried fish, and its transmission to places far inland which would not otherwise have made any effort to obtain it.* As at the same time it was by no means a luxury provided only for the tables of the rich, it was a matter of

---

* When the Reformation in England did away with fast days it was thought needful to pass laws enjoining the use of fish in order to prevent the ruin of the fishermen. All housekeepers were compelled by law to put fish on their dinner tables two or three times a week.

The following items may be of interest in reference to this topic :

"When every man religiously kept Lent, observed fast days, and refrained from fresh meat on Fridays, every mere and fish pond became a valuable property, and every stew and eel-pit was a little silver-mine."

Whittaker notices that from an Inquisition taken in the time of the necessity to keep down the cost as much as possible, and with that object to cheapen the processes of curing employed. In other branches of the Christian Church the rules as to fast-days have been different. In the Greek

---

last Earl Warrenne a fish pond of four acres was worth one-third more per acre than the best meadow land.

From a work entitled "Curiosities of the Church," by Mr. William Andrews, I extract the following:

"During Lent the butcher's business was suspended; and in the works of Taylor, 'The Water Poet,' we read:

'The cut-throat butchers, wanting throats to cut,
At Lent's approach their bloody shambles shut,
For forty days their tyranny doth cease;
And men and beasts take truce and live in peace.'"

"When the Puritans were in power they set at defiance law and custom in respect to Lenten fare. 'I have often noted,' writes Taylor, in his 'Jack a Lent,' 'that if any superfluous feasting or gormandizing, paunch-cramming assembly do meet, it is so ordered that it must be either in Lent, upon a Friday, or a fasting; for the meat doth not relish so well, except it be sauced with disobedience and contempt of authority. And though they eat sprats on a Sunday, they care not, so that they may be full gorged with flesh on the Friday night.

'Then all the zealous Puritans will feast,
In detestation of the Romish beast.'"

"Our forefathers were not permitted to partake of flesh meat in Lent, unless in delicate health, and then the privilege was granted by licence, but a like privilege could be secured by payment varying according to the rank of the petitioner. Some people broke the laws, and had to suffer severely for their offences. We may give as an instance the landlady of the 'Rose' Tavern, St. Catherine's Tower, London, in whose house, during the Lent of 1563, was found a quantity of raw and cooked meat. She, on this account, was put into the pillory, and four women who had partaken of the forbidden meat were put in the stocks all night. A few years prior to the foregoing case strenuous measures were adopted to enforce fasting at this season of the year. In 1548 was passed an Act of Parliament 'imposing a penalty of ten shillings and ten days' imprisonment for the first offence; and twenty shillings and twenty days for its repetition.' The informer received one half of the fine. In the reign of Elizabeth the penalties were increased to sixty

Church the fast-days are at least as numerous, but fish as well as flesh is strictly forbidden. The same is the rule amongst the Coptic Christians. With such facts before us, a most interesting enquiry is opened out as to whether any connection can be traced between these ordinances and the prevalence of a disease which we believe to be in direct connection with the eating of badly cured fish.

Proceeding now to enquire as to the relations between these Christian fast-observances and the spread of leprosy, the subject divides itself into two branches. First, we have to ask as to what happened in the early centuries of the Church, and secondly, as to what is occurring in our own times.

It is very certain that leprosy prevailed in Europe, to some extent and in many places, prior to the Christian era. As to how extensive was its prevalence, and where were its chief locations we have only fragmentary evidence. There is, however, good reason for believing that it underwent a definite increase from the time of the fifth and sixth

shillings, and three months' close imprisonment. Payments were sometimes made for permission to eat meat in Lent. In the church books of St. Martin Outwich, London, it is stated under the year 1525, 'Received of the Lady Atham for the use of the poore, for license to eat flesh, £0 13*s.* 4*d.*' "

James II. caused to be inserted in the *London Gazette* in the year 1687, a proclamation enjoining abstinence from meat during Lent, but saying that on certain conditions for giving alms to the poor, licences to eat meat in any part of England might be obtained from an office in St. Paul's Churchyard.

The chief Lenten food in the olden time was fish, and large quantities of it were consumed. In the thirty-first year of the reign of Edward III. the following sums were paid from the exchequer for fish supplied to the royal household :—" Fifty marks for five lasts (9,000) red herrings, twelve pounds for two lasts of white herrings, six pounds for two barrels of sturgeon, twenty-one pounds five shillings for 1,300 stock fish, thirteen shillings and ninepence for eighty-nine congers, and twenty marks for three hundred and twenty mulwells."

centuries, and appeared in many places formerly free from it. Universal testimony affirms that it exhibited a very remarkable increase in the eleventh and twelfth centuries, such increase as necessitated the formation of leper homes in all directions, and the enactment of laws for its repression. If it be nothing more than a coincidence it is a very remarkable one that the epochs named were precisely those during which the influence of the Christianity of the day was in the ascendant. In the latter part of this period, especially under the vigorous rule of Gregory VII. (Hildebrand) and some of his predecessors and successors, the celibacy of the clergy, the observance of fast days, and other regulations of the Church were enforced with a thoroughness which had never been known before. From that time too, the power of the Church over its clergy, and of the latter over the laity, began to decline. It has been customary to assert, without consideration, that the great twelfth-century prevalence was caused by the return of Crusaders who brought the disease with them from Palestine. But as I have shown, the disease is not for the most part personally contagious, and had it been so, it had for long existed probably quite as abundantly in the homes of the Crusaders as it did in the countries which they visited. During the two centuries which followed the time of Hildebrand, leprosy was at its height in the British Islands, and during those which followed it steadily declined. By the time the eighteenth century was reached it was almost extinct in England, though still occurring in Ireland, Cornwall and the Shetlands and Hebrides. Although its decline was apparently accelerated by the Reformation, it most certainly began very definitely two centuries before the completion of that movement. It may be suggested that a relaxation in Church discipline had been in progress for long before it culminated in Luther's protest. Wickliffe and Huss had lived and taught in the fourteenth century. It is not, however, for one moment suggested that the decline of leprosy in England was due exclusively, or even mainly, to the decline of the social power of the Church. Without doubt it was chiefly brought about by improved agriculture, and a general betterment in the food of the people. That the isolation of lepers in homes had nothing whatever to do with the decline I have, I trust, made definite in a previous chapter. The appended "Space-for-Time" Schedule will perhaps make yet more clear what I have just stated.

"SPACE-FOR-TIME" SYNOPTIC SCHEDULE OF THE PREVALENCE AND DECLINE OF LEPROSY IN EUROPE.

CENTURY

10th.—Leprosy for long recognized in many parts of Europe and increasing in England. Christianity advancing in Northern Europe and in England.

11th.—Time of Hildebrand, "One who eat flesh in Lent liable to have his teeth knocked out."—*Baronius.* Leprosy very prevalent throughout England and Europe.

12th.—The Crusades. Leprosy very common, and many leper homes founded, both on the Continent, and in England, Iceland, and all the northern groups of islands.

13th.—Leprosy at its height in Europe. It was almost universal with the exception of Russia (the Greek Church).

14th.—Commencing decline throughout Europe. Laws had been passed to prevent the storage of dried fish. The time of Wickliffe.

15th.—Many leper homes in England closed. Leper home at Sherborne reduced from sixty-three beds to thirteen, "whereof three are to be kept for lepers, if such can be found."

CENTURY

16th.—Order of St. Lazarus suppressed (1490) because of decrease of leprosy. Most of the English leper homes empty (1547).

17th.—A few British leper homes still had inmates, chiefly in Cornwall, the Shetlands, and Ireland. Rapidly diminishing throughout central Europe.

18th.—Leprosy still prevalent in Ireland. Public thanksgiving in Shetland for its almost complete extinction.

19th.—Only isolated cases (Shetlands, Hebrides, and Ireland), none in England. Still common in Norway, Iceland, Spain, Portugal, and the Mediterranean coasts, and the river-deltas of Black Sea and Caspian.

20th.—Throughout Central Europe and the British Islands extinct, with the exception of imported cases. Still fairly common in the fishing districts of Norway, Iceland, and the Gulf of Finland.

It is probable not only that a relaxation of the twelfth-century strictness in observing fast-days occurred before the Reformation, but that it extended to countries which never accepted the reformed doctrines. Thus in France at the present day it may be conjectured that the influence of religious creed has but little influence on the supply of fish as food, whilst in Spain and Portugal it is still great. In an article on the pilchard fishery off the Cornish coast, published in 1838, I find it stated: "It is said that Lent is not now so strictly observed as formerly in those countries to which the exports are chiefly made." Naples is mentioned as having long been one of the principal markets to which they were sent.

There are some points of interesting contrast between the religion of Mahomet and Roman Catholicism in reference to leprosy. The followers of neither faith are forbidden to eat fish, but whilst the one offers direct inducements to consume it, the other has an opposite tendency. The Mahomedan is enjoined to be careful and cleanly in his food, and to avoid all decomposing articles. He may not touch pork, and as a rule he is not a large fish-eater. Some tribes indeed abstain from fish altogether. There are many facts already on record which imply that Moslems are comparatively free from leprosy, whilst Catholics suffer in great excess, and I have no doubt that the more this question is examined, the more clearly will this conclusion be established. It is further, I think, very probably the fact that the almost universal disproportionate incidence of the disease upon the two sexes finds its most emphatic exemplification in Moslem communities, whilst it is most nearly obliterated amongst Catholics. It is amongst the Moslems of the Vale of Cashmere that the most extreme disproportion in the sexes has been observed, and amongst the Catholics of the West Indian Islands that it is most nearly absent.

Let me next deal with the widely prevalent error which holds that the Hindoo race, or at any rate certain castes in it, are, on religious grounds, strict vegetarians. I will begin by quoting the experience of one of India's first and most zealous Bishops:—

Bishop Heber* records that before leaving England he "had always heard and fully believed that it was a grievous crime in the opinion of the Brahmins to eat the flesh or drink the blood of any living creature whatever." But he had not sailed up the Ganges to Calcutta before he found himself compelled to abandon this belief. Among the "merchant ships and Maldive boats which crowded the Hoogly, and seemed to reproduce the naval activity of the Thames," he saw "the little barques of numerous fishermen who were employed in catering for the appetites of their wealthy countrymen, Brahmins as well as others." Fish he now found "is considered as one of the purest and most lawful kinds of food. Nothing, indeed, seems more generally mistaken than the supposed prohibition of animal food to the Hindoos. Thus many Brahmins eat both fish and kid. The Rajpoots, besides these, eat mutton, venison, and goat's flesh." Afterwards, in his voyage up the Ganges to Benares, Heber always found his Hindoo attendants ready enough to eat the fish that he gave them.*

---

* The author of the work on the Hindoos, published by the S. D. U. K. in 1884, from which I have taken the following extracts, insists in the clearest terms that the Hindoo religion does not enforce on any caste abstinence from animal food. "Even among the Brahmins no such pious abstinence from every thing which has had the principle of life exists, or ever did exist. Persons of this sacred caste eat animal food

In a letter to a friend Heber wrote: "You may be perhaps as much surprised as I was to find that those who can afford it are hardly less carnivorous than ourselves, and that even the purest Brahmins are allowed

---

like their neighbours, and if certain individuals or certain sects among them abstain, it is simply as a matter of taste, and not from any religious motive, for both by their laws and their scriptures the flesh of animals is expressly permitted to be eaten."

South of the Krishna it is thought that the Brahmins are more strict in this matter than they are in the north.

"Not only is the eating of animal food enjoined by Manu, but the abstaining from it on proper occasions is denounced as a heinous sin." "The man who, engaged in holy rites according to the law, refuses to eat it, shall sink in another world for twenty-one births to the state of a beast."—L. C., p. 373.

* Bishop Heber writes in another place: "Of fish likewise, whether fresh or salted, they constantly make use. Whole tribes of men subsist by catching them, and they are conveyed in vast quantities *into the interior*."

to eat mutton and venison." "Any person, Brahmins not excepted, eats readily of the flesh of whatever has been offered up to one of their divinities, while amongst all the other castes, mutton, pork, venison, fish, anything but beef and fowls, are consumed as readily as in Europe."

The result of my own enquiries in India would lead me to agree entirely with the conclusions arrived at by Bishop Heber. I do not believe that there is any race, sect, or caste of whom it can be inferred that its members do not some of them eat fish. In times of famine probably all eat it who can obtain it. The affirmative of these statements was offered me in conversation by many Indian residents, whilst, on the other hand, with a degree of emphasis in itself almost suspicious, the converse was asserted by others. The reader must balance the evidence and use his own common sense.

Although, however, I assert that the consumption of fish as food is universal throughout India, and that no religious profession can be accepted as proof that it has been wholly abstained from, it is yet most important to remember that the different castes, and even the same castes in different regions, vary very much in the degree of liberty allowed. Further than this, it must be kept in mind that although indulgence is, with a vast majority, no sin, abstinence is, with almost all, a virtue. The popular sentiment is not wholly unlike that which is felt in England as regards drinking spirits. Just as the entire female sex and a very large proportion of religious professors would in England repudiate the suggestion of being spirit drinkers, so is it in India as regards fish-eating. It is therefore quite useless to attempt to collect evidence on this point in leper homes. Denials will be made quite regardless of the facts, and the poor Indian leper has the great advantage over the English alcoholic that he is well assured that there is nothing in his symptoms of a nature to confute him.

It has long been imagined that the facts as regards Indian leprosy are opposed to the fish-hypothesis. It was thought that there are races and castes in the Indian population which have avoided the use of fish as food and yet suffer from leprosy. The result of enquiries on the spot has been to show, if I am not very greatly in error, that the Indian facts give most important support to the belief in question. Whilst there are large sections of the Indian population which practice vegetarianism with more or less strictness, there is none of which it can be assumed that such practice is absolute and that no fish is ever eaten. It can be shown that high-class Brahmins are far more strict than others, and there can be no question that these, as compared with others, are almost free from leprosy. On the other hand the Roman Catholics all over India suffer out of all proportion to other creeds.

The prevalence of leprosy in India in relation to religious creed would, indeed, appear to have arranged itself very much as might have been expected by a believer in the fish-hypothesis having before him the data just given.

It is scarcely ever met with amongst the Jains, it is very rare amongst the high-class Brahmins, it is sparingly prevalent amongst Hindoos and Mussulmans, being very exceptional in Mussulman women, whilst it is frequent in both sexes amongst the Roman Catholic Christians.

It is obviously unsafe to take the statistics of the leper Asylums of India as supplying accurate criteria as to the relative prevalence of leprosy in religious sects. It is quite possible that the prejudice against such asylums may be far greater in some sects than others, and the fact that many of them are under the care of Christian missionaries may very probably tend to the attraction of Christian lepers and the repulsion of those of other sects. In the Matunga Asylum, and in some others, and perhaps in most others, sectarianism is, however, very carefully excluded, and no special religious element prevails. The Report of the Matunga states that a Hindoo temple, fitted with suitable idols and religious books, has been provided. Still, however, these considerations unquestionably invalidate the *primâ facie* value of the facts as presented to us in statistical tables. No doubt these greatly exaggerate the apparently excessive prevalence amongst native Christians. If, however, we turn to the Census Reports, which apply to the whole population and not to any asylum, we arrive at similar, though not such strongly expressed, conclusions. The ratio of leprosy per ten thousand of these religions in the Bombay Presidency is there recorded as follows :—

Jain	2	per	ten	thousand (probably an error).
Hindoo	3·5	,,	,,	,,
Mussulman	4	,,	,,	,,
Christian	6·5	,,	,,	,,

Inasmuch as the term Christians includes Protestants as well as Catholics, whilst the latter creed, it seems probable, supplies almost all the lepers, we might perhaps without any unfairness suggest that this census report ought to give 10 or perhaps 12 per ten thousand to the native Roman Catholic population. According to this estimate not much more than one-third of the Christian lepers in the Bombay Presidency found their way into the Matunga Hospital. I have, however, reasons for distrusting this census table, even beyond the general distrust which applies to all statistics. The reporter states that amongst the Mussulman lepers the proportion of men is one per ten thousand, and of women seven. This is simply incredible, for all over the world men suffer from leprosy more than women, and the disproportion in the case of Mussulmans is supposed to be much greater than in any other community. In Cashmere, where almost the whole population are of Mussulman faith, less than 10 per cent. of the known lepers are women.

The Mussulman population of the Bombay Presidency amounts to four millions, and the native Roman Catholics to only 98,000. It is true that almost the whole of the latter are in the Bombay district, but this cannot be held to explain the fact that the Christian lepers in the asylum outnumber the Moslems, for without doubt the Moslem population of the district and city far outnumbers that of the Christian.

The case becomes yet stronger if in place of the Moslems we compare the numbers of Christian lepers with that of the Jains. The latter may almost be described as the Quakers of Hindooism.* They are a reformed sect, consistent to the verge of punctiliousness in the carrying out of their tenets, and most of them are strict vegetarians. Now the number of Jains in the Bombay Presidency is 535,950, whilst that of the whole Christian population is only 216,118; yet they have never sent a single leper to the asylum; and further, what is of much more importance, the census reports for 1902 inform us that no Jain Vani in the whole presidency has been returned as a leper. The number of "Salsette Christians" in the asylum in 1897 was sixty, and to this should be added an unknown number, probably not inconsiderable, of those who remained at their own homes.

As regards the supposed immunity of the Jains from leprosy, it is a little difficult to be quite certain of the facts. As far as my own personal investigations went, I should have reported the whole of this community free, for although I asked for Jains at every leper-house I visited, I never met with a single one, nor did any of the superintendents of these institutions ever suggest that they had ever had one. Several native medical men, however, mentioned cases to me which they had known in private practice, but in all cases speaking of them as being very exceptional.

---

* It is to be clearly understood that the Jains are not a race but a sect. They stand in a similar relation to Hindoos that Methodists and Quakers do to members of the Established Church in England. As I have named them above, they are the Quakers of Hindooism. The sect has, however, become to a large extent hereditary. It is of very old standing, dating perhaps from times anterior to those of Buddha.

The Jain community in India amounts altogether to 1,400,000, and calculating that the prevalence of leprosy throughout India is 5 per 10,000, this number ought to supply 700 lepers. It is in the Bombay Presidency that the greater number of Jains are found; and in the last Census Report, Mr. Enthoven writes (page 166): "Europeans, Parsis, and Jain Vanis show no lepers on 100,000 of the population."*

The Leprosy Commission which visited India in 1890 stated that leprosy was found amongst the Jains, though rarely, and reported, in proof of their assertion, one single example of it. It would appear that none of the Commission had ever seen a Jain leper; and, from the manner in which this single case is authenticated by giving the name of the medical attendant, &c., it would appear to have been the only one mentioned to them. I believe it was the same patient whose case was brought forward at one of my meetings by the same medical man. It is true that the Commission wrote: "It seems indeed that the disease is impartially distributed among the fish-eating and the non-fish-eating communities." In making this statement, however, I think they went very far ahead of any facts which were in their possession, and certainly in direct opposition to some which I have obtained. If, however, we cannot say more respecting the immunity of the Jains than that all the evidence points to its being almost complete, we are, respecting the Roman Catholics, in a position to assert most definitely that they suffer out of all proportion to other sects or classes. If we were to compare the figures afforded by leper asylums, we should find that, although a very small body in comparison with the Mussulmans, they afford a larger total of lepers. This method, however, would be open to the obvious fallacy that it may be that Christian lepers go into asylums more willingly than do those of the native religions. If we compare the number in asylums with the total population of the different creeds, this fallacy is not only got rid of, but another in quite an opposite direction is introduced; for, of course, the number in any given asylum does not represent the total in the Christian population of the district. Many of the Christian lepers are, no doubt, still at their own homes, and many others may be inmates of other asylums in the district. Thus, in the Tarn-taran Asylum in the Punjab, on the calculation that in the community there were two lepers per 10,000, the Mussulman population (14,000,000) might have supplied 2,800, and the Hindoo population, of 13,000,000, 2,600, whilst the little Christian population, of only 72,000, ought to have sent not more than 14; it did, however, to this one asylum alone, which is only one of five under missionary care in the Punjab, send no fewer than 34.

---

* This statement, however, is rendered a little obscure by the fact that on the next page, without one word of explanation, the same reporter tabulates under the name Jain two per 10,000, and also places one Parsee per 10,000, having stated in a previous page that there were none in 100,000. One difficulty respecting the Jains is as to what is the precise meaning to be attached to the word Vani, or trader, but it is obvious that if there were none in 100,000 the disease must be exceedingly rare amongst them.

Under the term Christian are here included Protestants as well as Catholics, and English as well as natives. If we restrict the calculation to the native Christians, which is only fair, seeing that the Europeans supply no lepers, we should then find that its calculated proportion would be only eight. Very similar statements apply to the Calcutta Asylum, to that of Madras, and that of Bombay.

[The questions dealt with in this chapter will be found discussed in greater detail in several subsequent ones.]

Appended Notes.

Mr. Listoa in 1854 collected the particulars of twenty-eight cases of leprosy at the Bombay General Hospital. There were twenty-one Hindoos, five Christians, two Mussulmans, and two Parsees. Thus the number of Christians more than doubled that of the Moslems, and was nearly a quarter that of the Hindoos.

The enthusiasm of new converts in the time of the Reformation led to rapid changes in custom. Thus we are informed of a certain parish priest who preached at Paul's Cross in the third year of Edward VI. that he wished "to unsaint the churches and *to change the fish days into festivals*."—*Stow's Life.*

"Visiting the temples for the purpose of propitiating the ruling spirit of Buddha is left almost entirely to the women. Men very seldom interfere in these matters, being quite satisfied with their wives and daughters doing so." This is written of Japan, but something of the same spirit may be met with in many other countries.

CHAPTER XIII.

THE LEPROSY OF THE BIBLE.

It is not worth while to discuss in any detail the expressions used in the Bible in reference to leprosy. It may be sufficient to say that whilst it is tolerably certain that the disease, as we know it, existed amongst the Jews, the greater part of what is written in their literature concerned other and wholly different maladies. Probably all forms of chronic skin disease, of which there are many, were included under that name. The details of the Levitical law recognised a leprosy of the house-wall, and prescribed forms of thanksgiving for cures after very brief periods of treatment. These clearly have nothing to do with modern leprosy, which is invariably a long lasting malady, and which never affects any bodies except those of human beings. The allusions to fear of contagion and to the necessity for isolation become but of little importance when we remember what has been just said. The disease for which a man was secluded from his fellows for a week and then allowed to bring thanksgiving offerings for cure was clearly something very different from leprosy. Incidentally we have evidence that in chronic cases—those which presumably approached more nearly to the true type—isolation was not practised.

Naaman the Syrian, although a leper, was still "a great man with his master," and came attended by his officers into the presence of the King of Israel. His wife and her young handmaiden were apparently living with him, and we have no hint that any precautions against contagion were thought desirable. It is even made clear that the King of Syria had been accustomed in his house of prayer to lean upon the hand of his leprous Prime Minister.

The expression "a leper as white as snow," which is used in reference to Gehazi, the Prophet's greedy servant, is like others of uncertain meaning. The words "as white as" are an interpolation—though by no means an improbable one—of the translator. The Hebrew text is simply "as snow," and may possibly refer to the abundant silvery scales which characterise the skin disease known as *psoriasis*. If, however, they are intended to imply a pure whiteness of the skin, then we may say that in modern leprosy no condition which should be so designated is ever observed. Undoubtedly white spots and patches are produced, but a general bleaching of the surface is so rare that it may be said to be unknown. On the other hand, there is a condition technically known as "leucoderma," and sometimes in leprosy districts as "white leprosy," in which the skin does simply become snow white. It is not a serious malady, and has no connection whatever with true leprosy.

We may note with interest that the Scripture record makes no mention of the paralysis, the loss of sensation, and the helpless crippling of limbs which attend the true disease, but speaks of it as if it affected the skin only, and had its consummation in whiteness.

CHAPTER XIV.

ON THE DISPROPORTIONATE PREVALENCE OF LEPROSY IN THE TWO SEXES.

It is a very remarkable fact that in most parts of the world leprosy affects many more men than women. Usually the proportion is three men to one woman, but this is not universal. In some the difference is much greater, as, for instance, in Cashmere, where it is possibly only one woman to ten men, whilst in a few the disproportion is much less, or possibly there may be none at all.

What may we infer from this? First, I think we may say that it certainly implies that leprosy is not usually inherited, and next, that it does not usually spread by contagion. If it were either contagious or hereditable there is surely no reason why women should be comparatively exempt. Does it give any support to the fish hypothesis? I think it does, for, as is well known, women are as a rule more fastidious feeders than men, and so would be less likely to become fond of strong-tasting fish. Next, also, we may note that in districts where salt fish is expensive men are the most likely to obtain it; and, further, that men travel more freely than women, and are therefore more likely to visit places where salt fish can be obtained. There are, however, some other considerations of much interest to be mentioned. In countries where fish is very abundant and very cheap, there both sexes are likely to eat it, provided there be no prejudice against it. This occurs in the island of Minicoy, where it is said that both sexes eat four fish meals a day, and where leprosy is exceedingly common, and where it is reported to affect both sexes alike. It occurs also in the West Indian islands, where, again, women suffer much more than in most other places. Here the effect is probably increased by the circumstance that there are many Catholics. In countries where Catholic fast-days are observed it is reasonable to suppose that so far as these influence the prevalence of leprosy they will do so equally in the two sexes. It is necessary, however, to remember that the Church does not ordain the eating of fish on fast days, but only abstinence from flesh meat. It may, therefore, easily be the case that many women, in countries where vegetables are plentiful and salt fish scarce and of bad quality, may prefer to abstain almost wholly from it as well as from meat. This may not improbably apply to Spain and Portugal, and possibly to Colombia. On the other hand, there may be places where the authority of the Church is not strong, and where women observe the fasts more rigidly than the men.

It is not possible to estimate this relative prevalence in the two sexes with any approach to accuracy in all places. As a general fact, however, it is indisputable, as has just been stated, that the disease is far more commonly seen in men than in women. The proportion, I may repeat, is probably two-thirds of the one to one-third of the other, and in some places the disproportion is even greater.

In some cases the figures quoted refer to the cases admitted into leper homes, and in others to the entire population. Allowance—in some cases very liberal—must be made for the strong desire on the part of women to conceal the malady, and their greater dexterity in doing so. It must be remembered, also, that women are more reluctant to leave their families and enter leper homes. This feeling in India applies with especial force on account of the unwillingness of women to submit to medical examination by men. Amongst Moslems it probably amounts almost to universal refusal.

In Havana the proportion of men to women is as five to one.

The reports from the West Indian Islands were (see Coll. Ph. Rep.) almost unanimous in reporting an equal distribution in the two sexes. They at the same time record that the disease is common amongst the cleanly and well-to-do. It is clear, therefore, that if due to some article of food it must be one which is attractive to all classes and to both sexes. Over and over again it is stated that in these islands the diet consists chiefly of salt fish and vegetables.

In New Orleans (Louisiana) Dr. de Blanc records twenty-six males and sixteen females. The population contains many Roman Catholics, and the supply of fish is plentiful.

The disproportion is very remarkable in Ceylon. Here one observer says one woman to thirty men; another (counting his hospital patients) one to ten. Now, the Cingalese are Buddhists, and are forbidden to take life, and they eat fish only by a venial evasion of their ritual law. The supply of fish in Ceylon is only scanty, and it is used chiefly as a sort of condiment. It is much valued, and no doubt men get an unfair share of it.

In many places where the population is largely Mahomedan the disproportion is very great. Thus in India generally, whilst Hindoo women suffer in the ratio of one to two or one to three, Moslems show only one to seven. This may possibly be explained by the fact that although the use of preserved fish is not forbidden to Moslems, it is in many of their tribes discouraged, and that under such conditions women are more likely to be obedient than men. Moslem women, we must remember, lead secluded lives, and are very careful as to their food.

The exemption of women in Cashmere is very interesting. Dr. Neve, in his first report, gave only 4 per cent., but in a more recent one he estimated it as 10 per cent. Almost all the lepers in Cashmere are Mahomedans (147 Moslems to 5 Hindoos).

In South Africa, according to Impey's statistics, there are nearly three times as many male lepers as females. Impey suggests that difference in habits and occupation, and not any intrinsic difference in liability, must be held to explain the excessive prevalence in the male sex. Thus far no doubt he is right, but we must still press the question, What are the differences in habits and occupation? When he suggests that men are more exposed to vicissitudes of the weather, and that "those who are engaged in hard manual labour are more liable to contract the disease than those engaged in less trying and arduous pursuits," it is difficult to agree with him. The vicissitudes of weather are not great either in India or South Africa, and in both countries women as well as men engage in laborious pursuits. In Cape Colony it is from the farm labourers that the supply of lepers chiefly comes, and it is for this class also that the "sack-fish" is chiefly imported inland. This kind of fish is largely eaten during harvest time, or any season of extra work. It is supplied chiefly to the men.

The disproportion in sex in Cape Colony is also shown in a table given in Dr. Gregory's report for 1894.

Of Europeans eighteen were males and only three females. I infer from this that but few were from commensal communication, and most from fish-eating.

Of the coloured, 141 were males and 106 females. Commensal communication may have had more influence, or the women as well as the men may have eaten fish.

Of the coloured in the Native Territories (fish not obtained in any large quantity on the spot) 235 were men and 173 females. Of these, probably, not a few cases were from commensal contagion, and thus the large total number of females; but the disproportionate number of men was probably due to their migrations.

In connection with statements as to the influence of sex, it is to be added that the disproportion occurs only to adults. Wherever data are procurable as to young persons, the numbers of the two sexes are found to be equal. This is probably to be explained by the suggestion that children acquire the disease by commensal communication (at the breast chiefly), and not by fish-eating.

In India, as a whole, the proportion is about one to three.

Dr. A. F. Anderson, who wrote an excellent monograph on Leprosy as seen in the Straits Settlements, states: "I have never seen leprosy in the female." His explanation was that he supposed that the women when affected concealed themselves.

Information taken from the College of Physicians' Report and other sources supports Dr. Anderson's statement as to the great rarity in the female sex, but no suggestion of concealment is made. The suggestion of concealment of female lepers may be valid to a certain extent, and in some instances may be important, but it must not be allowed too much weight. Leprosy is a disease not very easy to conceal, and as it may last a life-time and often, even after recovery, leaves permanent and conspicuous mutilations, it would not be possible but that most cases should sooner or later become known.

The real explanation of the exceptional rarity in women in these regions is that Chinese coolies (almost exclusively men) supply almost all the cases. It is accounted an almost exclusively "Chinese disease." See Cantlie's Prize Essay.

In New Brunswick (Canada) the difference is said not to be great. Here fish is very abundant, and the population affected is Roman Catholic.

In Minicoy it is reported that women lepers are in excess of men. The population here is Moslem, but fish is eaten by all in great excess.

In Norway it was formerly reported that more women than men suffered, and although recent statistics have rectified this statement, it still remains the fact that the disproportion of the sexes is far less than in most other countries, for much more than half are women (832 to 566) 1 to 1·5. Here fish is largely consumed by both sexes.

On many occasions at the leper asylums in India I encountered illustrations of the general fact that women are far more fastidious than men as to what they eat. Not infrequently a woman would admit that her husband used to eat dried fish, but would deny, with an almost amusing emphasis, that she had ever tasted it. This was remarkably the case at Tarn Taran, where most of the men admitted having eaten fish and the majority of the women stoutly denied it.

Excepting the one which I have suggested, I do not know of any hypothesis which can with plausibility be suggested as explaining the disparity of the sexes in proneness to leprosy. That it can only be in connection with food is, I think, obvious, and, if it be food, then it can only be fish. It will have been sufficiently clear from what has been advanced that in applying the suggestion now given, careful regard must be had to differing conditions in different regions. An explanation which is applicable in one place may be otherwise in another.

Thus then, making all allowance for fallacies, the general bearing of the facts may be stated to be as follows: The usual disproportion of the sexes is one woman to three men. This disproportion is maintained, or even increased, in all countries where fish is comparatively scarce and dear (Ceylon, South Africa, India, Cashmere).

It disappears in certain fishing centres, where the whole population may be said to almost live on fish (New Brunswick, Minicoy, Iceland).

It disappears or greatly diminishes in certain districts where it is stated that the richer classes and the poor suffer alike (the West Indian islands, Brazil, &c.*).

Something may perhaps be learned from the age period most liable to leprosy in the two sexes. When the disease begins in early life it is more probably due to commensal communication (mother's milk, contaminated sweetmeats, &c.) than to fish-food. The more advanced the age the more probable is it that the fish-food taken by the person affected has been its cause. I may perhaps assume as established that in India and in many other places, women eat much less salt fish than men do. A table given at page 173 of the Bombay Census Report affords facts on this subject. From it we learn that in the age period from 0 to 5, the proportion of female to male lepers was 705 to 1,000; from that age onwards it progressively diminishes until during the period 25 to 30 it was only 364 to 1,000. After the latter period the same proportion with unimportant variations was maintained. In the several quinquennial periods, the proportion stands as follows: 705, 696, 575, 511, 545, 364. Thus it is seen that the incidence of leprosy in the female sex diminishes as childhood is left behind. This fact fits well with the suggestion that whilst in early childhood the two sexes run equal risks, in later life, when the personal selection of articles of food comes into play, then the male encounters the larger share. My inference from this is that more women than men derive their disease from commensal communication in childhood, and that a considerable proportion of the female lepers who deny having ever themselves eaten fish may perhaps be speaking the truth.

---

* In Antigua there were eleven of each sex; in Barbados, twenty-four men and twenty-one women; in Trinidad, equal proportions, and the same in British Guiana; in Malacca and Labuan, very rare in women; Mauritius, eighty-three men to twenty-six women.

CHAPTER XV.

INDIAN OBJECTIONS TO THE FISH-HYPOTHESIS.

My object in visiting India was to ascertain whether the supposed objections to the fish-hypothesis in that country could be explained away. I was already familiar with the statements of most of those who had written on the subject, and more especially with the report of the "Prince of Wales Commission," and with the maps showing local distribution which accompanied it.

Just before leaving England I received the following from Mr. Wellesly C. Bailey, one whose name is well known to all interested in the lot of the Indian leper:—

> "With regard to the main question which is taking you to India, while not entering upon any argument for or against, I would like to call your especial attention to the fact that the most leprous districts in India are to be found in those parts of the country where the people have but little opportunity of procuring fish of any kind. Take for instance the Kangra, Chamba, and Simla districts of the Punjab Himalayas; Bankura, Bardwan, Bheerbhum, and Manbhum, in Bengal; and the Chattisgarh division in the Central Provinces."

Most of the districts mentioned were those to which my attention had already been directed, and thus guided I made special enquiries respecting them, and visited several, selecting those in which it was held that the negative evidence was strongest. In the "Leprosy Gazetteer" which is to follow, I shall mention most of them, and to avoid repetition must be content now to state that nowhere did I find any real exceptions to my creed. It is true that in many places the supply of fish is but small, but it is also true that fish is obtainable, and that but too often it is bad in quality. Everywhere it is highly prized by those who can get it, and is eaten without much regard to its condition.

During my tour in India, with the willingly accorded co-operation of the principals of the several medical colleges, I held public meetings in the four chief cities, at all of which free discussion was invited.

If the objections to the fish-hypothesis as applicable to India may be estimated by those brought forward by the various speakers who took part in these several debates (at Madras, Calcutta, Lahore, and Bombay), I think I may venture to say that they are not unanswerable. The fact that Brahmins and even occasionally Jains become lepers, and that as a rule these sects abstain from fish, was repeatedly mentioned, but as at the same time it was freely admitted that such cases are exceedingly rare, it remained quite possible that accidental contamination of food might explain them all. One speaker at Madras, a native practitioner, who fully admitted this kind of risk, stated that high class Brahmins often employed wet nurses for their children, and added that there was a prevalent belief that the use of fish by the nurse tended to improve the supply of milk, and was often insisted upon by those who would not eat fish themselves. It was also stated that Brahmin children up to the age of nine were exempt from all restrictions as to food and were allowed fish in all forms.

A yet more frequent objection was that the supply of fish as food in India did not correspond with the prevalence of leprosy. No definite exceptions to the relationship were, however, brought forward, and several speakers made statements which showed that they were in possession only of very imperfect knowledge. One referred to Balasor as a well-known fishing place and stated that leprosy did not occur there. Although he said that he spoke from personal knowledge, it was easy to confute him by reference to printed documents proving that in some parts of that district it is exceptionally prevalent. On no fewer than three occasions I was advised to go to Burmah, and was assured that I should there find a community addicted to the use of decomposing fish to an extraordinary extent, but almost free from leprosy. Here again the reply was ready that the statistics of leprosy in Burmah are published, that the Commission had reported on them, and that it was a well-established fact that leprosy is very prevalent there. The Chota Nagpur district was mentioned as non-fish-eating by several authorities, and the Punjab by others. In both of these districts I subsequently visited those Asylums which had been specially named, and found on personal enquiry that the facts were not in the least exceptional to the creed which I hold. Both at Purulia (Chota Nagpur) and Nikodar (Punjab) with very few exceptions all the inmates of the asylums had been fish-eaters. Theoretic objections were of course frequently alleged, and although no one attempted to answer the arguments put forward in disproof of contagion (in any other form than commensal communication) yet repeatedly the assumption was made that contagion from touching clothes, &c. was not only possible, but was almost the only way by which the disease spread.

No third hypothesis was indeed hinted at anywhere, and the opponents of food-causation always took for granted that, despite the adverse evidence, the disease is virulently contagious. Many speakers instanced facts which appeared to imply hereditary transmission, but to these my reply was that commensal communication in infancy was a more probable suggestion, having regard to the large amount of evidence which so strongly discredits heredity.

The fact that the bacillus has never been found in fish and has not yet been cultivated on fish-media was, of course, repeatedly urged, and on many occasions I was asked to state definitely whether I thought that the bacillus really existed in fish. To this I was obliged to reply that further investigation was needed, and that my creed restricted itself to the general assertion that in some way not as yet understood, the poison which causes leprosy is received into the system in connection with fish in unsound or bad condition. The fact that leprosy has wholly disappeared from many countries where the use of fish as food had yet been continued was also alleged, the British Isles being especially mentioned as an illustration. It was pointed out that in Ireland where the Catholic formularies have not been abandoned, the disease has died out almost as completely as in England. I was fain to admit that if a few sporadic cases of leprosy did still occasionally occur in the fishing districts of the United Kingdom they would give valuable support to my hypothesis, but in their absence I could but ask attention to the fact that it was precisely in these localities that leprosy had lingered longest, and that it was indisputable that better methods of fish-curing had come into universal use, that the consumption of fish near to places where it is caught had, under the influence of improved means of transit, diminished to the extent that in some places it had almost wholly ceased. The introduction of the potato into Ireland had also, I urged, exerted an important influence in causing neglect of local fisheries. No section of the population of either England, Scotland or Ireland, not even the very poorest, would at the present time eat fish which was not either perfectly fresh or thoroughly cured.*

---

* To those who urge as an objection that salt-fish is still consumed in the British Islands, and that no leprosy occurs, I would commend the statements of old writers as to what was common in their day. Erasmus writes : " If ever a waggon laden with salt fish meets the wayfarer, what a running away ensues ; what stopping of the nostrils ; what spitting, what clearing of the throat " (*excratio*, or, as a commentator has suggested, possibly we ought to read, *execratio*). Nothing of this sort is now encountered in any of the roads of Britain. If at some fishing villages we may be reminded of it, the stench arises from fish offal which

I reminded my audiences that the use of better qualities of salt had probably had a very important influence on fish-curing, and suggested that this was a matter which urgently demanded attention in India.

Many who took part in these discussions were inclined in a cautious manner to accept the fish-hypothesis, but most were I think desirous to impose limitations and to think that it was only one amongst several. Other articles of food were suggested as being possibly also vehicles of contagion, and the importance was urged of poverty and general neglect of sanitation as predisposing influences of possibly equal importance as regards the result with the exciting cause. To these I replied that leprosy was one and the same disease in all countries and races, that it often affected those who were well fed and in no way negligent as regards cleanliness, and that it was improbable in a high degree that such a malady could acknowledge several different classes of causation, or that it could be otherwise than dependent upon a single and very definite one.

I shall in some following chapters enter into more detail as to my Indian experience. I will not, however, omit here to state that after personal investigation in those districts, said to be most exceptional, I came away with an assured conviction that whilst there is in India very much which gives strong support to the fish-hypothesis of leprosy, there is nowhere anything which controverts it.

Dr. Vincent Richards, an observer who has taken far more trouble than any one else in examining into the bearings of the fish-hypothesis in India, writes from Balasor, March 8th, 1872: "The inhabitants of Balasor, or Northern Orissa, are, as may be supposed from the topographical features of the district, a fish-consuming community, and, like the Burmese, who prefer the stinking

has been carelessly thrown into the street, and not, as was the case in the sixteenth century, from that which was destined for human food.

ngapee to fresh fish, they consume fish which is in a semi-putrid state; of this fact one is constantly reminded, when driving through the station, by the stench that issues from the baskets of fish *in transit to the markets in the interior*." He adds that leprosy is uncommon at Balasor, and that it is "seldom that a leper can be seen in the bazaar." Contrasting Balasor with the neighbouring district of Bancoorah, he adds, that in the latter place where fish is scarce, leprosy prevails to a great extent, more especially amongst the members of the lowest caste, who from their circumstances consume the smallest amount of fish.

In reference to these statements it must again be suggested that it is the quality and not the quantity of fish consumed which influences the prevalence of leprosy, and that moreover, as Dr. Richards records, the decomposing fish from Balasor was being carried to the markets inland, that is, precisely to the places where the disease is found. The statements just quoted received, moreover, important qualifications subsequently.

Some years later Dr. Vincent Richards supplied another important paper to the *Indian Medical Gazette*, (September, 1889) "A Geographical Sketch of Leprosy, and the Question of its Relation to the Consumption of Fish in Bengal, Behar, Orissa, and Assam." From this paper I quote the following:—

> "I have stated that leprosy is prevalent in one particular spot in the district of Balasor, and I now purpose giving a slight sketch of the place and its inhabitants. Kaligaon is a village consisting of 177 mud huts, and is situated eight miles south-east of the civil station, and five miles from the sea. It skirts a salt, swampy tract of land, and is very low, being in what the natives call a *pát* or saucer. During the rains a considerable portion of it is under water, and it is very difficult of access. Rice is extensively grown on the adjacent tracts, and a large quantity of vegetables is also grown by irrigation from ponds and khals. The water-supply is bad. There is no more than the usual over-crowding. The people generally are said to be well-to-do, and the respects in which their diet differs from the general population are that they eat more fish

and less *dal,* and perhaps more salt. There is a population of 946 inhabitants, consisting of 323 adult males, 300 adult females, and 323 children. They are principally members of the Brahman, Khandait, and Khandra castes; there are also a few fishermen. Of the 947 persons, no fewer than forty-five are lepers, and considerably more than half are Gokhas, Khandras, Khandaits, and Khadals. It is most prevalent among the Gokhas, Ielis, and Khandras, especially the first. The Gokha is, as I have before explained, the fisherman caste. The fact of the disease being so prevalent amongst this class is undoubtedly remarkable, and *certainly seems to indicate that the consumption of fish does exercise some influence in producing this disease.*"

The census report for the Punjab District for 1901 shows such a satisfactory decrease of leprosy that the reporter, Mr. H. A. Rose, is able to remark: "It would be hazardous, perhaps, to conjecture that leprosy is on the verge of disappearance, but it seems permissible to hope that the next ten years will show a considerable decrease in the number of sufferers." The decrease shown by the census of 1891 as compared with that of 1881 was 36 per cent., and that of 1901 compared with that of 1891 shows a further decrease of 20 per cent. This decrease has occurred chiefly in the middle periods of life, and curiously there has been a slight increase of lepers under ten years of age.* The ratio in this large but thinly populated district has always been small, and it is now reduced to less than 2 per 10,000. The general opinion is that there is very little fish-eating in the district, and in many parts of it almost none. What is eaten is chiefly fresh fish from the rivers, for the greater part of the district is far distant from the sea.

The central part of this region is a flat sandy plain known as the Indo-Gangetic plain. In this plain tributaries of the Indus, flowing west, and of the Ganges, flowing east, have their origin. There is no mountain range and thus no conspicuous watershed. From this it must arise that there are large districts having no streams of any size, and that the conditions for fish breeding are singularly absent. In this plain (which includes Lahore) leprosy is almost unknown, not amounting to 1 per 10,000.

---

* I cannot find in the census reports from Bengal, Madras, or Bombay any data for similar calculations.

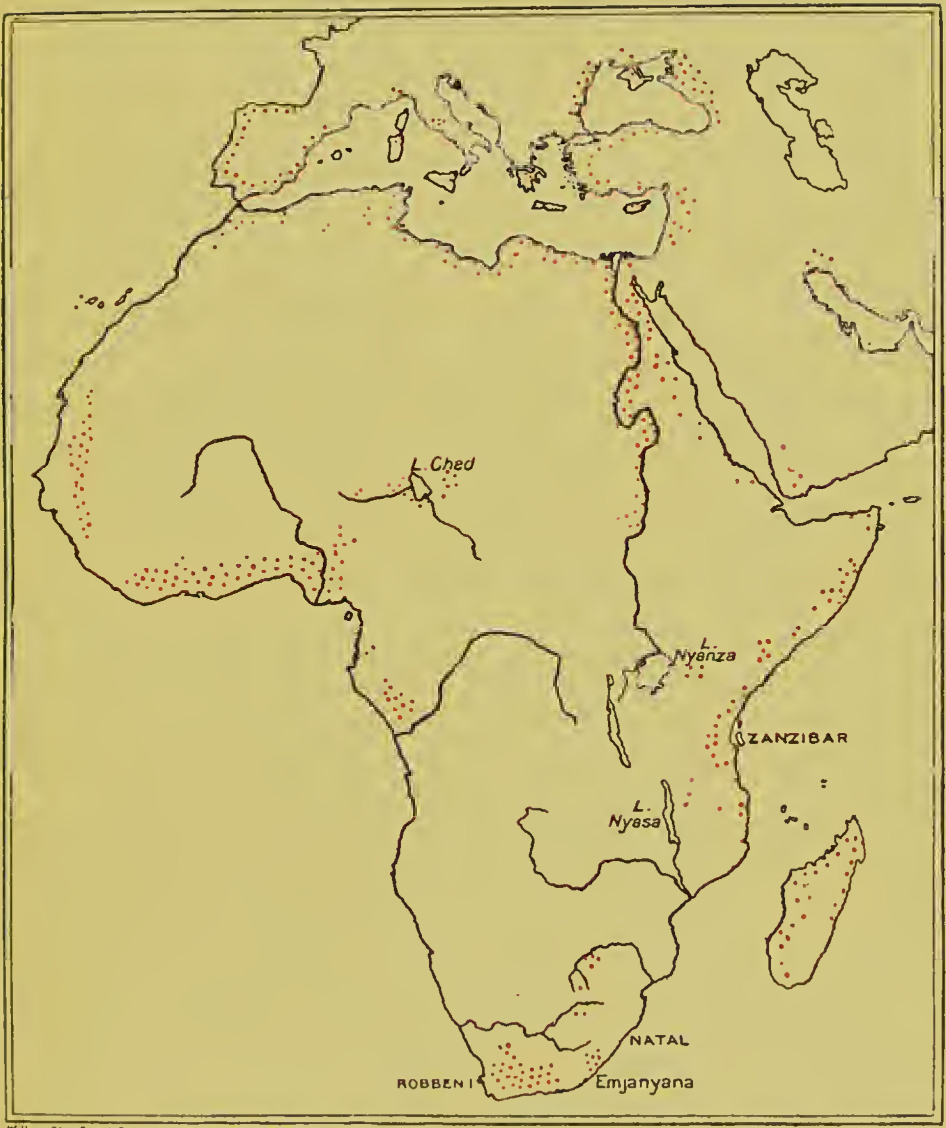
West of the Indo-Gangetic plain is what is known as the North-West Dry area (comprising Shahpur, Multan, Peshawar, and Dera Khan). In this region again leprosy is almost unknown. North of these districts we have the Himalayan and sub-Himalayan, and in both of these the disease is more prevalent. In the sub-Himalayan (Ambala, Sialkot, Gujrat, Rawal Pindi, Hazara), the disease attains a prevalence of 2 per 10,000, whilst in some parts of the Himalayan it reaches that of 11. This remarkable development is probably apparent rather than real, and is caused to a considerable extent by the scantiness of population and the presence of several leper asylums. The district includes Mahan, Simla, Kangra Mandi, Sulset and Chamba.

That there is a certain amount of fish-eating over all parts of the Punjab is beyond question. The supply is, however, seasonal, and depends on the rains. A traveller through the region in the winter months might suppose it almost a desert. He will cross vast regions of dry sand in which the bare suggestion of fishing will seem an absurdity. If, however, he will return after the rains he will find the scene wholly changed, and rivers, streams, tanks and ponds swarming with fish. This change occurs especially in the plains, and is less marked in the mountains, which latter throughout the year keep their rocky pools and are the resort of sportsmen in search of fishing. Now the plains constitute by very far the greater area of the district, and as we have seen, they furnish an insignificant quota of the lepers.

There is, I believe, wide-spread misapprehension as to the fish-supply in the mountains. Most people imagine that the plains must be the districts best supplied with water and the most likely to afford fish. I have been assured by those of great personal experience that the reverse is the fact. Major Columb, whom I met at Amritzar, and who for long had been stationed with his regiment (Gurkas) in sub-Himalayan territories, told me that there was always plenty of fish to be had in the mountain streams and pools. He added that his men always ate with avidity what he caught, that the villagers were well provided with nets, and that from personal knowledge he could state that whenever the catch was beyond immediate needs they endeavoured to preserve it by drying or salting. He added that they would eat it in conditions of approaching decomposition, such as would entirely have prevented any European from tasting it. These statements apply, I believe, to the Hill districts, which supply inmates to the asylums near Simla, and which also send a quota further south to Tarn Taran and Jullundur.

I was not myself able to visit Simla and inspect its fish market, but I may fairly quote my experience at Darjeeling as applicable to the sub-Himalayan range generally. Darjeeling and Simla are at nearly the same altitude, 7,000 feet, both of them commanding magnificent views of the Himalayas themselves. The facilities for the supply of fish may be supposed to be much alike. The Commission when it visited Darjeeling found the fish supply good, and recorded its surprise that fish was freely obtainable at that altitude. I can from personal inspection confirm their statements. I saw in the market plenty of very fine, freshly caught fish, and in the bazaar salted and dried fish of various kinds. This statement is not to be held to imply that fish in these districts is a common article of food. Probably it is not, but most certainly it is obtainable, and it is obtained, to some extent, in all its various conditions, by all classes of the community.

PLATE V.



William Stanford & Company, Ltd, Oxford

Map of Africa, Etc., showing Distribution of Leprosy at the Present Date.

[*To face page* 126.

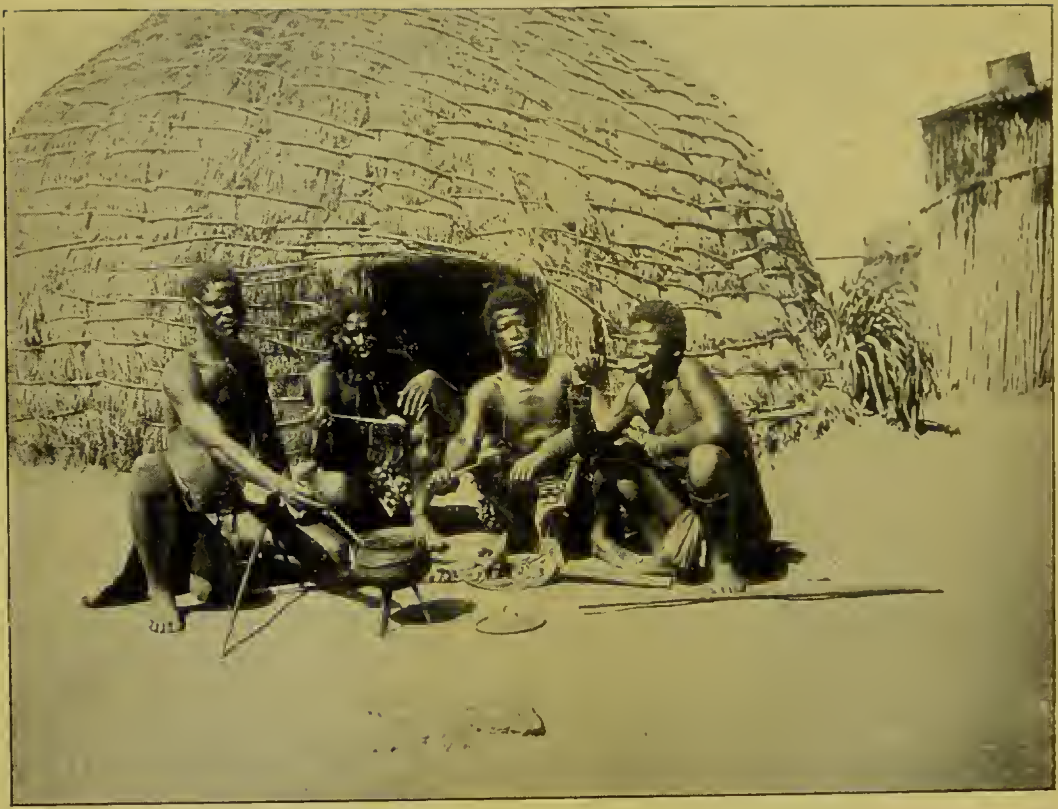
CHAPTER XVI.

LEPROSY IN CAPE COLONY AT PRESENT DATE.

The local distribution of leprosy in Cape Colony has received the attention of several observers. Dr. Gregory and Dr. Impey have both given us statistical tables, and the latter has even published a Leprosy Map. There do not exist, however, the data upon which to base any trustworthy statements as to numbers. Dr. Impey's map is invalidated by the circumstance that it is based solely on the admissions to Robben Island. It is obvious that the energy of local authorities as regards expatriating their lepers may have differed much in different districts. The main facts, however, may be considered to be fairly well established, although we shall do well to be distrustful of details. I have availed myself of the statistical statements of these authorities, and have endeavoured to supplement them by reference to the published Health Reports, and by facts elicited in the course of private inquiry. My first general statement must be that although at the present time leprosy prevails over almost the whole of South Africa, it is nowhere plentiful, and that it has no centres in which it can be considered to be endemic. It is scattered over the whole land. This scattering is not, however, uniform. There are districts in which it is scarcely known, and there are those in which it is relatively abundant. The division of South Africa into separate territories, and these territories into separate districts each bearing a special name, has been made without much regard to natural boundaries. It becomes, therefore, exceedingly difficult to make use of this arbitrary division into provinces in the investigation of the statistics of disease.

It must also be remembered that the coloured population of South Africa, whether of Hottentot or Bantu descent, is a very movable one. The men wander from place to place in search of wages, or it may be from sheer love of wandering. They go to the large towns and to the mines, and having acquired money, return to their homes. Nor is this proneness to travel in all cases confined to men. Now, keeping in mind the fact that the seeds of leprosy are slow to germinate, and that the disease may delay to reveal itself for ten or fifteen years after the place where it has been acquired has been left, we can easily realise that a map showing where lepers reside, or, as in Dr. Impey's map, the places which they assign as their homes, may be most fallacious. The conditions of the leper's home may be very different from those of the place where the disease was acquired. In attempting to explain the local incidence of leprosy in South Africa, we must, then, not be content merely to count the cases in any given district. It must always be kept in mind that the disease may have originated in some distant locality. It may be developed *de novo* in connection with food, it may be communicated by personal intercourse (eating), and possibly it may be transmitted as an inheritance. In one place one of these influences may be the chief one, in another it may be the others. Putting aside the suggestion of inheritance for the present as being unproved and perhaps not probable, we may deal with the other two, respecting which we are on sure ground. That the disease is not capable of communication from one person to another, excepting under conditions of extreme carelessness, will be admitted by most. It does not spread by that means in any community in which ordinary cleanliness is observed. In South Africa we may take it for granted that it is only amongst the coloured

PLATE VI.



KAFFIRS FEEDING.

To illustrate possibilities of Commensal Communication. (From a Photograph.)

[*To face page* 129.

races that it is likely so to spread. We may also probably assume that it is almost solely to young children that it is likely to be so communicated. Even in Hottentot or Kaffir kraals it is not very probable that adults will often take food directly contaminated by a leper's sores. With young children this may be, under certain circumstances, almost habitual. We have also to remember the risk encountered by infants from their mother's milk. It is, then, in the native hut and amongst native children that we must look for cases of leprosy having their origin in personal communication. Probably in nine cases out of ten in which adults exhibit for the first time the symptoms of leprosy after having attained full age, the disease may be regarded as *de novo*, or, in other words, as of food origin. The indefinite length of the latent period introduces an element of uncertainty here, but the risk is probably much what has been suggested. Allowing the suggestion of personal communication to explain in part the prevalence of leprosy when we encounter it in native tribes and in young persons, we have next to ask what are the conditions which may be supposed to favour its prevalence when of food origin. It may be here remarked that the facts as regards the distribution of the disease in South Africa are very strongly opposed to the idea of any other form of contagion or infection than the single one to which I have referred. It is spread very sparingly over immense districts, and it has shown no tendency to develop strongly in any one. It has persisted in those localities in which it first originated, but nowhere with the result of obtaining any remarkable prevalence such as would suggest contagion, whilst it is continually breaking out in almost isolated cases in places far distant from each other. Even in its old-established haunts those who suffer from it are seldom aware that they have ever exposed themselves to risk. Constantly it happens that those who have been exposed to obvious and great risk escape. It is the father of a family who is the victim, whilst his wife and children remain free, or it may be a single one of a large number of near relations. Such facts do not suggest contagion, but imply rather the existence of some under-current of influential causation, the incidence of which may be modified by circumstances.

The first general observation which I venture to offer in explanation of the distribution of leprosy in South Africa is that it goes with the Dutch element in the population. The Dutch are as a race fond of salt-fish. It was under their auspices that fish-curing establishments were formed at Cape Town, and it was in Dutch farms near to Cape Town that, in the year 1756, the first recorded cases of leprosy in South Africa occurred. In the early days of the Colony the Hottentot slaves were fed on rice and salted fish, and at the present time the Boer farmers still supply salt-fish to their labourers. It is precisely from this class of labourers that most of the colonial lepers come. If a white person shows leprosy he is almost sure to be of Dutch, and not of English descent. The fondness of the Dutch for salted fish, and its habitual use in their households, far exceeds anything which Englishmen are accustomed to. It is in connection with nationality, then, that Stellenbosch, Caledon, Malmesbury, Paarl, and Cape Town itself have always been, comparatively speaking, strongholds of leprosy. It is in the same connection that it obtained footing in the Orange State and the Transvaal, and prevailed extensively there at a time when it was still unknown in Natal. It will, however, easily be seen that other influences apart from mere national habit and appetite may tend to regulate the consumption of salt-fish. It may be unobtainable, or procurable only at a high price, or it may be so abundant and cheap that it is used only in its freshest and most wholesome state. In connection with this last suggestion I may again remark that it is an error to suppose that the fish theory of leprosy involves unusual prevalence of the disease on the coast. It is not where the fish is caught, but where it is eaten, and where it is eaten in a bad condition (that is, of partial decomposition) that we must expect the disease. In many parts in or near the tropics fish is eaten in a bad condition at the same place that it is caught, but this is by no means invariable, and, for the most part, the families in the homes even of fishermen eat their fish fresh, or do not get it at all. The motive for salting or drying it is to render it suitable for export, and it is amongst those to whom it is sent that we must look for its effects. The development of the country as regards means of transit has also a very definite influence on the consumption of fish at or near to the place of its capture. So long as there are no means of sending it inland so long, but no longer, will the bulk of the fish taken be consumed near the coast. When roads, or, still better, railroads, are established, the demand for cured fish inland will compete with that on the coast, and may possibly attract the whole supply. A century ago such places as Kalk Bay, Saldanha Bay, and other places on the coast were the haunts of leprosy, but they no longer are so in any exclusive sense, for the disease has travelled inland. As has been already said, the first case of leprosy which I ever saw from South Africa was in the person of a Welsh engineer who had been engaged in the making of the Kimberley railroad, and had been fed on salted fish brought to him along the rails which he had laid down. Those rails have been since then, unless I am much mistaken, responsible for the spread of leprosy broadcast, or more correctly linearly, over the territories which they feed.*

Quite apart, however, from Dutch population and Dutch habits of diet, there have been other very important agencies at work in determining the local consumption of salt-fish in the regions under our consideration. The demand for labour at Cape Town, Port Elizabeth, East London, and especially at the great mining centres, has attracted the native population—always a mobile one—to these centres. Here Hottentots, Cape Boys and Kaffirs of all clans have congregated, and for their supply large quantities of salt-fish have been imported. At Kimberley, Johannesburg, and Pretoria salt-fish has been of recent years a common article of diet, and it has been consumed by all classes, by some more and by some less. It is useless to attempt to go into detail; we must take the broad facts. Leprosy cases have occurred at all these places, but in a very large majority, although we may believe that the seed was sown there, the crop did not show itself until the return of the labourers to their homes. We must not therefore expect the tale of lepers recorded at these districts to be unusually large.* Very commonly a Kaffir labourer does not remain at the mines more than a year,† and the incubation stage of leprosy generally extends over several.

---

* See note, p. 132.

It would be tedious, and a not very instructive task, to attempt to examine in detail the relative prevalence of leprosy in the various districts into which Cape Colony is now divided. I must be content with having offered what I believe to be the real clues to its explanation.

---

* It has been sufficient in and about Pretoria to necessitate the building of a leper house on a liberal scale, and both Pretoria and Bloemfontein have sent many victims to Robben Island.

† The migratory proclivities of the Cape boy and the Kaffir are remarkable. In Tembuland (native territory), one of the principal districts for the supply of the South African labour market, I was assured (Dr. Caistor, of Cala) that it was very exceptional for a Kaffir not to have been at one or other period of his life a labourer in Cape Colony. Nor was it only the men; many of the women had also travelled in search of work, and secured engagements in Grahamstown and other places.

My general conclusion is that leprosy in South Africa will always be found in ratio with the salt-fish-eating habits of the population, and that the latter depend upon facilities for supply, ancestral habits, and the existence of a large native population in a condition of dependence for maintenance upon the whites. To this it must be added that it is reinforced in certain native districts by a few cases caused by commensal communication—that is, by food taken from lepers' hands. It seems, however, very doubtful whether the latter is a sufficiently powerful source to maintain the disease for more than one or two generations in the absence of the food-cause.

Although I have excused myself and my readers from any attempt to examine in detail the local prevalence of leprosy in South Africa, yet it seems desirable to give a brief account of the Cape Town region.

This region comprises Cape Town and its extensive suburbs. It also includes the nearly-adjacent districts of Stellenbosch, Paarl, Malmesbury, and Caledon. In all these districts there are towns which date from almost the earliest periods of the Dutch settlement. Stellenbosch is probably the oldest town in the Colony next to Cape Town, and it still retains much of its original character, being to South Africa what Nuremberg is to Germany. It was near to Cape Town itself, in the Drakenstein district, that the earliest cases of leprosy in the Colony were recorded (1756). It was in the districts with which we are now dealing that it spread in the first instance, and to which for long it was wholly confined. They constituted, in fact, for some time the whole of Cape Colony. In later years which have witnessed the vast extension of the Colony, leprosy has also extended its area, but these districts still continue to be its chief homes. It was in these that the Dutch farmers first taught their Hottentot slaves to eat rice and salt-fish, and it is in them that the latter article has always been a common article of diet both for natives and whites.

The greater part of the region is easily within fifty miles of the capital, and the roads in most directions are good and have been long established.

Fish-curing was in the first instance carried on in Table Bay itself, but it subsequently extended to Kalk Bay, Hout Bay, Saldanha Bay, and other places on the coast of this region.

Taking this region as a whole, the prevalence of leprosy is in itself greater than in any other part of South Africa. According to Dr. Impey's figures, it reaches the proportion of 13·1 to 10,000, whilst in no other does it exceed 10·6.

The city of Cape Town itself does not afford any large number, and these are met with chiefly in the suburbs. This fact, I must believe, entirely confutes Dr. Gregory's statement that the disease is in ratio with density of population. Cape Town has a population amounting to 146 per square mile, and Caledon one of 6·9, yet the latter, a hilly and beautiful district, with a population of only 12,000, has twenty-two lepers, whilst Cape Town, with a population of 97,000, has only eighty-eight—that is, eight per ten thousand, whilst Caledon has nearly eighteen. Any argument in favour of contagion, based upon the supposition that density of population favours it, here clearly falls to the ground.

A very noteworthy feature in the leprosy statistics of the Cape Town region, and one in which they differ from those of all others, is the frequency with which those of European descent suffer. In almost all other parts the dark races suffer almost exclusively, but in the Caledon district of the Cape region, unless there be some error, the proportions are almost equal. For the whole region they stand four per 10,000 of whites to twenty-one per 10,000 of coloured, the highest attained in any other being that of 2·5 to 12·6 in the Cradock and Queenstown region.

It is surely not possible from these facts as to the Cape Town region to base any argument in support of the belief in contagion. The disease has, for certain, been present there for more than a century and a half, yet it is still very sparingly prevalent. The population, in comparison with the rest of South Africa, is dense, yet the disease has not tended to increase to any great extent. Probably within the last quarter of a century it has not increased at all, and it is now but slightly in excess of what we find it in a region which has been occupied only quite recently, King William's Town. Had contagion been the sole means of its spreading, the Cape Town region ought to have a hundred-fold in excess of King William's Town, and Cape Town itself in yet greater excess as compared with its adjacent districts. Why should Caledon, Stellenbosch, and Malmesbury suffer more than the crowded capital?

On the other hand, the supposition that the disease is caused by eating salt-fish supplies—if I mistake not—a very adequate explanation of the whole. The habits of the communities of these districts are probably not such as to favour food-contamination after the fashion which I have suggested as accounting for the spreading of the disease in Kaffir kraals. Most of the cases in the Cape Town region are probably *de novo*, and result neither from inheritance nor from commensal communication, but from common food. In Cape Town itself but little salt-fish is eaten. There is an abundant and varied supply of food of other kinds. If salt-fish is purchased it will be in retail quantities, and will be consumed at once. On the other hand, in country districts twenty, thirty, or fifty miles away the conditions are very different. There the supply of meat is more variable. Salt-fish is procurable at cheap rates, and the temptation is to buy it in wholesale quantities and to consume it (at farm stations) only slowly. I do not make these suggestions without the authority obtained by inquiry of wholesale dealers in Cape Town and at shops in the country, and they are corroborated by the testimony of not a few lepers with whom I have conversed on Robben Island and elsewhere.

CHAPTER XVII.

HISTORY OF THE ORIGIN OF LEPROSY IN SOUTH AFRICA.

The consideration of the leprosy problem in South Africa presents peculiar attractions, since it is almost certain that, at any rate as far as Cape Colony and the adjacent territories are concerned, it was developed in connection with the advent of Europeans. The disease is now prevalent, though only sparingly so, over almost the whole Colony, and it affects individuals of all races.

The numbers have been counted and set down in statistical tables. It was estimated by Dr. Impey, who wrote in 1895, that there were 600 lepers in Cape Colony proper, 250 in Griqualand East, the same number in Basutoland, and nearly as many in Natal, whilst the Orange Free State had only 150, and the Transvaal Republic only thirty.

Whilst these figures must not be taken as more than approximative, they may be allowed to prove that the disease does really exist in all the territories named, and they support Dr. Impey's assertion that "the disease is much more prevalent in South Africa than is generally known."

Dr. Impey further states as his conclusions—that leprosy has been known in Cape Colony since the middle of the 18th century, that it is making increasingly rapid progress, and "that the Hottentots, of whom the Griquas are an offshoot, were, on account of their nomadic nature, the cause of the spread of the disease amongst the Bantu (Kaffir) races."

It is with this latter assertion that we have first to deal. Is it probable that the Hottentots have had anything to do with the dissemination of leprosy, or with its origination, in this part of the world? And here, of course, a most important inquiry comes in, Did leprosy exist amongst them before the Dutch founded Cape Town? A not inconsiderable extent of reading of the journals of those who have travelled among the Hottentots in the first half of last century leads me to believe that the disease was unknown, excepting in the proximity of Cape Town and some other seaports and fishing towns; and further, that it is still unknown amongst populations at a distance from European centres in most of the inland parts of South Africa. An exception must again be here made for the neighbourhood of the large lakes and rivers.

Mr. James Backhouse, a Quaker missionary, and a well-informed and very intelligent man, travelled during several years—1840–1843—in South Africa, and as he never stayed long at any one place, he had unusual opportunities for observation as to the condition of the people. Although not a medical man he carried drugs, and very frequently prescribed. His journals give much detail as regards the diseases which he encountered amongst the Hottentots and other races, and he never so much as once mentions leprosy as occurring north of the establishment at Hemel en Aarde.* Now, leprosy is a chronic and a very conspicuous malady, certain to attract the attention of a quasi-medical traveller like Mr. Backhouse. Dr. Livingstone a little later for several years resided in the northern part of the district now known as the Transvaal, and subsequently made his famous explorations in yet more northerly districts. He was a medical man, and practised his profession amongst the natives wherever he went. I have been unable to find in his journal, published in 1857, a single reference to leprosy. In his life, which was published subsequently, there does occur one isolated mention of the disease; and it was in the neighbourhood of the Victoria Falls. Although we must assume that the diagnosis was correct, it is a very singular circumstance that only a single patient —a chief—is mentioned as suffering from the disease, and that there is not the slightest allusion to its prevalence in the district. The Victoria Falls are in mid-Africa as regards the coast on either side, in latitude 17°, and on a tributary of the Zambesi River.

---

* Mr. Backhouse gives very interesting details of his visit to the Moravian leper home known as Hemel en Aarde, but this institution was within a short distance of Cape Town and drew from a population which consumed salt-fish.

It is suggested, from the silence of Backhouse and Livingstone, that with the exception of districts near to Cape Town leprosy was almost unknown in Cape Colony in the the first half of the 19th century. Its habitats were then well recognised near to Cape Town itself, and we may, from the silence of these travellers, safely assume that they did not meet with it in more remote parts, and that it was not common anywhere.

I have read also the travels of Christian Frederick Damberger, who in 1801 travelled from the Cape of Good Hope through the Colony and northwards, and, as in the case of Backhouse and Livingstone, I find no mention of leprosy. I do, however, get from this author a statement which, in reference to my view of the question, is of great importance, that, even at this early period amongst residents not far from Cape Town, salt-fish was supplied to the Hottentot slaves as an article of food. This, however, he mentions only once or twice, and at all other places records that amongst both Boers and Hottentots he had to be content with milk, meat, and vegetables.

We will turn next to the facts as regards the earliest observations of leprosy at the Cape. Dr. Impey tells us that no mention is made of it earlier than the middle of the eighteenth century, that is, about 100 years subsequent to the first formation of a Dutch settlement at Cape Town, and he holds that it is reasonable to conclude that till that time the disease was not prevalent in the European settlement. Although he adds that the disease existed amongst the Hottentots, he does not mention a single fact in proof of it. He assumes, without offering any evidence whatever, that it spread by direct communication from the north. My argument is that it probably spread in the opposite direction. At the present day, when we have good knowledge as to the diseases common amongst the Hottentots and other allied races, we know for certain that it is an infrequent malady. It is the positive assertion of all authorities that until quite recent years it was unknown in the Natal Colony.

In conversation with Sir F. Lugard, an observer who has lived in India and seen much of leprosy there, I have been told that during his African travels, which have extended through Cape Colony, but have chiefly concerned inland districts north of the Zambesi, he has never there encountered leprosy.

To return to the history of Cape Town. On May 10th, 1756, the local authorities of Stellenbosch reported to the Governor of the Colony that there were cases of leprosy, and asked for instructions as to what was to be done. A special report was drawn up, and it appeared that the victims were two Dutch farmers, and that one of them had then been the subject of the disease for eight years. It was only in two families, and in each instance the father of the family had been the first victim, and although he had continued to live with his wife and sons and daughters, only one other case of the disease (a daughter) had occurred. In each instance there was a large family.

Dr. Impey very reasonably remarks that the "fuss made over these cases shows clearly that at that time leprosy was not a common disease in the colony," and adds, "probably those two cases were the only lepers in the Colony at that time." There is not a hint of any suspicion of its having been contracted from the Hottentots. Although Dr. Impey gives some degree of credit to Hottentot traditions of leprosy he does not believe that these Dutch farmers obtained it from them. His statement runs "Leprosy was probably introduced into the Dutch settlement from the Dutch East Indies, where the Europeans obtained their servants." On this supposition it is, however, strange that the record makes no mention of any such disease in the servants. It is on record that a commission of surgeons appointed for the purpose made careful search for other cases and found none. A circumstantial account of this enquiry is given at page 33 of Minutes of Evidence before the Cape Leprosy Commission of 1894 (a Blue Book). It is full of interesting detail but makes no suggestion as to how the disease had arisen. Dr. Impey speaks of two, but really there were three patients, and one had been a leper for 18 years.

No further record of proceedings with reference to leprosy occurs in the Cape Colony archives until the beginning of the next century.

In 1817 the Governor of the Colony (then under English rule), Lord Charles Somerset, issued a proclamation that for purposes of isolation the lepers of the district should be sent to Hemel-en-Aarde, a secluded valley in the Caledon district, which had been considered well suited for that purpose. The patients who were sent there were chiefly Hottentots and bastards who had, under the Dutch, been slaves. It is stated that at this time the disease was prevalent among these Hottentots, and that for five years previously the Moravian missionaries had been collecting the poor outcast lepers at this spot. Not long afterwards lazarettos were established at Graaff Reinet and Port Elizabeth for the temporary collection of lepers prior to their being sent to this home. Let it be clearly borne in mind that most of the places named are within comparatively short distances of Cape Town itself, and that the others are on roads of direct communication with adjacent fishing villages.

Between 1816 and 1845 over 400 lepers were admitted at Hemel-en-Aarde. No seclusion was enforced, their residence at this place was voluntary, and they were allowed to have their friends with them. It is clear, therefore, that whatever opinions may have been prevalent, no very cogent fear as regards contagion existed. In the year 1845 the need for additional leper accommodation induced the Government to give up for that purpose part of some old military buildings on Robben Island, which were then occupied by lunatics and convicts. It remained, however, a matter of individual option with patients whether they took advantage of this retreat, and when there no strict isolation was enforced. Ever since the year 1845 the subject of leprosy in Cape Colony has been causing additional anxiety to the Government, since the disease has been observed to be steadily spreading both among white and coloured races. The increase is said to have been greatest near to Cape Town itself, and in the Paarl. In 1892 a Leprosy Repression Act was passed, and under it lepers were drafted to Robben Island from various districts, including even some from the Orange Free State and Bechuanaland.

A very important statement is given as regards the Basutos by the late Dr. Cassilis, a medical man who had resided for 30 years in Basutoland, and who averred that the disease was formerly unknown to the natives, and had until recent years been confined to strangers. At present, among the Basutos themselves, there are 250 lepers, and the disease is increasing. So far as I can ascertain, it is not till near the middle of the last century that we get any evidence of the existence of leprosy in any of the unmixed native races. In 1863 it is on record that the Griquas, a branch of the Hottentot race, were suffering from it. The district surgeon of Mount Frere alleges the first discovery of the disease in his part to have been within the last 10 or 15 years. At Umtata it is said to have been introduced 70 years ago. At Ngamatsare it is said to have been imported 22 years ago by a native who had returned from residence in Cape Colony: and it is added that it does not appear to be materially increasing. A number of other places are mentioned by Dr. Impey, in his Prize Essay, in very similar terms. It would be tedious to mention them, but in all it appears to have been suspected that it was introduced by the bastard Hottentots from Cape Colony. And in all the increase, although there has been some, has been but to a very slight extent.

The conclusion to which the facts just cited would appear to point is that the disease has spread through some change in the habits of the people, probably dietetic, which has been of very slow progress, and which has had its centre of origin at Cape Town. At no single place is it recorded that a violent outbreak, such as might be supposed to result from contagion, has been observed. Although no precautions against the spread of contagion had been taken, and although it must have happened that in all cases the early stages of the disease were overlooked, yet nowhere has anything approaching to an epidemic occurred. An isolated case here and there, lingering long, and followed by a few others in no direct association with it, would appear to be what has happened. Nowhere has any popular alarm as to contagion been originated.

Now there is one article of diet concerning which it may be very plausibly alleged that its gradual introduction amongst all classes in Cape Colony has been the cause of the spread of leprosy, and that is salted fish. Early in the history of Cape Town its Dutch founders introduced a number of Malay slaves from their eastern colonies, with the express object of founding a factory for curing fish. That industry has prospered, and is to this day in the hands of the Malays, and salted or dried fish is now an article of consumption wherever it can be conveyed throughout the Colony and of export to other parts. Its export in the year 1874 from the whole Colony amounted to 5,000,000 lbs., and was valued at £35,000. At the present time fish is largely caught and dried at other parts of Cape Colony besides Cape Town, notably at Port Elizabeth, which is, as we have seen, one of the places where it has been necessary to found a lazaretto.

If the Hottentots had been the means of spreading the disease, not the slightest explanation can be given as to why its spread did not commence much earlier in the history of the Colony, nor why it is not in the present day mainly restricted to them. If, on the other hand, they became its victims, like others, in connection with the adoption of a new article of diet, then all is clear. The annals of the country repeatedly record that natives who had left their homes and gone to reside for a time at coast-towns became lepers after their return, and the addition is often made that they were the cause of its spreading (but only to very slight extent) at their homes. Many isolated facts may be added to what I have already stated in support of the theory advanced. Thus, Dr. Impey tells us that in Pondoland, a district then only recently annexed to British dominions, there are no lepers. He adds, what appears to me an entirely gratuitous suggestion, that the chiefs of the country would probably inflict the penalty of death upon all suffering from it. It is far more likely that the exemption is accounted for by the fact that they have not yet begun to import salted fish. Pondoland is situated just south of Natal, and is a district noted for its beauty and for its good pasture land.

We may profitably contrast the slow progress of leprosy in South Africa with its very rapid increase in the Sandwich Islands. In both places its advent was coincident with the formation of a fish-curing establishment, which was a novelty in the district. In the Sandwich Islands, however, this occurred in a small community densely populated, and where a change in dietetic habits, especially the introduction of a new and attractive article of food, would be likely to become very rapidly general. These conditions are otherwise in South Africa, where difference of race, difficulties of transit, and the abundant supply of other articles of food would conspire to make such a change of habit slow and gradual. Salted and dried fish, however, is acceptable to almost all races by whom it is obtainable, and its use under favouring conditions rapidly becomes general. Whilst from its cheapness and abundance in and near the coast towns it is likely to be consumed more there than elsewhere, it is at the same time an article easy of carriage, and certain to command sale wherever it can be taken. We have seen that on the testimony of Damberger it was already, in 1800, an ordinary ration supplied by the Dutch in the neighbourhood of Cape Town to their Hottentot slaves and bastards. It is not going beyond what the facts suggest to hold that the spread of leprosy since that time has been *pari passu* with the advance northward of European settlers and the making of roads. It is to those districts especially where railroads have penetrated that the supply of Cape fish is likely to have been abundant, and, speaking in general terms, I believe that it is chiefly in those districts that leprosy has recently shown itself. As I have already stated the first case of leprosy from the Cape which came under my notice in London had for its subject a Welshman, who had been engaged in prospecting for a railway, and who told me that salted fish from Cape Town had often been the only kind of animal food that he could obtain. Among those with whom I conversed on Robben Island was a clerk to a fish-factory in Saldanha Bay (white). He told me that for months together he had sometimes been compelled to live on fish.

CHAPTER XVIII.

LEPROSY IN THE NATAL COLONY.

NATAL is a district of South Africa on its eastern shore, which lies between the sea and the Drakensberg Mountains. It consists of a series of terraces which rise higher and higher to the foot of the mountains. To the north is Zululand, the Tugela River dividing them, and to the south is Pondoland, part of the district formerly known as Caffraria. Its area is 17,000 square miles, and it is inhabited by various tribes of the Bantu family, popularly known as Kaffirs, most of whom are of mixed descent, and still retain their aboriginal customs. The term Zulu is popularly synonymous with a Kaffir of Natal, but not in strict language, for the Zulus are only one tribe, and that not a large one. They are, however, physically the finest race, and are accustomed to assume a position of superiority on account of their military history. Natal is a very healthy district, and its native population, living upon maize, millet, and the produce of their herds, have always been esteemed a very healthy race. They have a strong prejudice to fish as food, and, as a rule, never eat it. It may be taken as certain that until about sixty years ago leprosy was unknown amongst them.

Natal has a population of 380,000, which is made up as follows:—Whites, 30,000; Indian coolies, 20,000 (on the coast lands and of quite recent introduction); natives, 330,000.

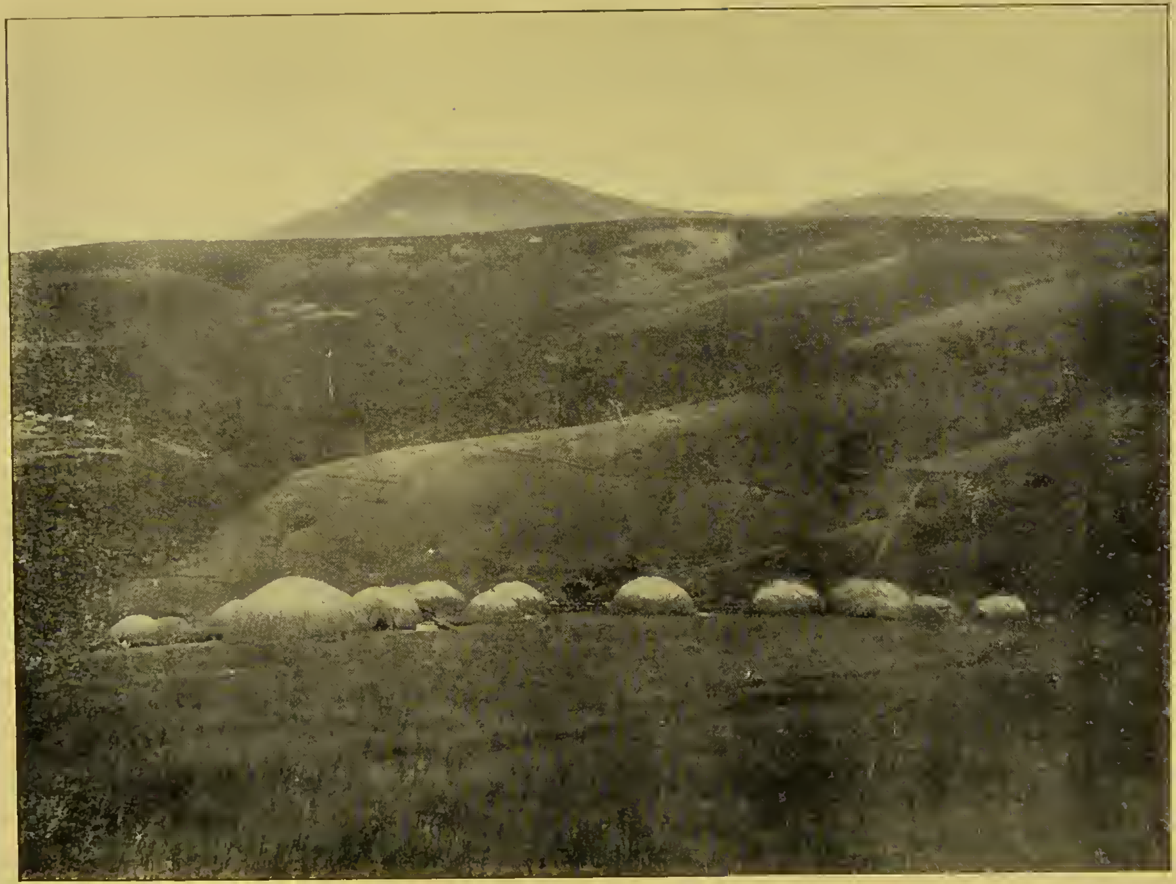
As regards the earliest appearance of the disease in Natal all evidence concurs in fixing it about the year 1843. This was Sir Theophilus Shepstone's date. He stated that the first death from it was the chief's eldest son, Bafakee, and occurred after 1846. For many years it was believed to be confined to the Amapepeta tribe, in which it had begun, and the cases were very few in number. Subsequently, as stated by Sir Theophilus in his evidence before the Commission, "it established itself in a good many localities, some near, others at a long distance from, the tribe where it first broke out." This conclusion, as we have seen, is well borne out by the evidence from other sources, and we may take it as certain that in Natal, as elsewhere, the disease originated, apparently *de novo*, at many and very distant places.

Now, without doubt the fact is that the disease was introduced at several different places. Many Natal natives go in early adult life to seek work in Cape Colony, and we may safely assume it as probable that in all cases in which such natives became the subjects of leprosy, they had obtained the germs of the disease at the mines. It is inconceivable that the disease should originate, without special cause and almost simultaneously, at various and distant places on the hills of Natal. Those who showed it must have obtained it either by contagion or by food. At their own homes they could not have got it from food, for no fish is eaten. It is, therefore, certain that they had acquired it either by contagion or by fish-eating in Cape Colony. It is certain that it had not come in from the East, for at that time there had been no introduction of coolies, and the disease was unknown on the coast. Whilst freely admitting that when once introduced into a Kaffir kraal the disease may spread by commensal communication, we may take it as certain that its introducer must have been a man who had resided for a time in Cape Colony and there obtained its germs.*

---

* It is to be understood that a Natal Kaffir has but to cross the Drakensberg to find himself in Cape Colony. Pretoria, Johannesberg,

PLATE VII.



Kaffir Kraals in Natal.

[*To face page* 149.

In January, 1885, the Natal Government appointed a Commission to inquire into the extent of leprosy in the Colony, and the best means of meeting it.

This Committee reported in July, 1886, having in the meantime examined the literature of the subject and taken a certain amount of local evidence. Amongst the conclusions arrived at by the Commission were:—

> "From evidence which we have taken as exhaustively as it was within our power to do, it has been conclusively demonstrated to us that leprosy is widely spread over the Colony, that it is slowly increasing among the native population, having made a home for itself in several centres, from which it is being propagated, as the natives think (in many cases, no doubt, correctly so), by hereditary transmission; that it has also broken out in isolated localities where no contact can be traced between the affected and those people among whom the disease has been known to exist for years, notably so in Alexandra Country (*vide* Chairman's Report, dated March 9th, 1886)."
>
> "How it originated the Commission cannot, from the evidence before them, hazard an opinion of their own. There are two native stories, each accounting for its appearance in a particular district, one story being that the disease appeared in Zikali's tribe some years ago, having been brought by two members of the tribe who had lived for two years in the Cape Colony (Grahamstown). Subsequent to their

---

Kimberley, Graham's Town, Kings Town, Port Elizabeth, and East London are all within his easy reach. Few things please a young Zulu better than to take up the three long sticks which now represent the assagaies which his fathers carried, and set off on his travels. His hope is to come back with money enough to buy cows and a wife. He is a good worker when away from home, and he makes no difficulty as to conforming to the habits of those about him. From the first hand testimony of many Kaffirs who had been to the mines, I am able to assert that when there they habitually eat the salt-fish which is provided for them. In a few instances the man whom I was interrogating denied that he himself had done so, but all asserted that their companions did. What they called "sack-fish" was stated to be an ordinary article of food at the mines. In explanation of denials after return home, one Zulu told me that no girl would marry a man who admitted that he had been in the habit of eating fish.

return they became lepers, and the disease has since spread among the people, and has probably extended to other localities in the upper districts."

"It appears impossible that leprosy in this Colony should arise from causes assigned for its appearance elsewhere, such as bad sanitation, diet of salt meat, salt fish and vegetables in an unwholesome state, none of these causes being applicable to natives in this Colony. Their dwellings are airy, constructed of basket work, so to say, and covered with grass, through which the air penetrates. The insides of the huts are kept scrupulously clean, and the kraal (a collection of huts) also; in fact, a native dwelling will compare favourably with an ordinary labourer's cottage in Great Britain or Ireland. The situations selected for the erection of kraals are dry, airy, and elevated. The people do not eat fish—fresh, salt, or putrid. The little meat they do eat is, as a rule, anything but putrid. They use Indian corn where Europeans use wheat; the grain is as good in one case as the other. Leprosy cannot, therefore, be traced to any of the above-mentioned causes."

"In the cases in Alexandra Country, which are fully described in the Chairman's Report to the Commission, dated September 24th, 1885, no case has been discovered of any intercourse between the affected and others who have the disease or whose distant relations had the taint. Thus arises another difficulty. When and how did these people contract leprosy?"

"It is well known that leprosy had existed for many years in the Cape Colony, but there is no evidence of the slightest degree showing that at the time the disease is said to have broken out in the Mapapeta tribe the inhabitants of the Cape Colony had had any intercourse with Natal Zulus; in fact, it is well known that they did not."

"How, then, the Mapapeta contracted leprosy there is no clue that we have been able to find."

"We desire it to be clearly understood that we are not convinced that leprosy is propagated solely by contagion, infection or intercourse of the sexes."

The Commission repeatedly records its conviction that the disease had sprung up in various parts of the Colony independently, and, so far as any evidence was obtainable, *de novo*. Neither inheritance nor contagion could in many instances be suggested with any plausibility. It is exceedingly to be regretted that under these circumstances no careful inquiries appear to have been made as to the places where the men who first showed the disease had previously resided.

I must omit to examine the individual cases which were investigated, but those who wish to do so will find them recorded in detail in the Government Blue Book.

CHAPTER XIX.

VISIT TO A SOLITARY LEPER NEAR MARITZBURG.

Whilst I was staying at Maritzburg I was taken, by the kindness of Dr. Hill, the Government medical adviser, to see a very instructive example of what might be called a sporadic, or solitary, case of leprosy.

It was the only case of the disease of which Dr. Hill could hear within driving distance of the city, and it had been known to the authorities for many years. Rumour had asserted that there were others in different localities near, but on careful inquiry their existence was so doubtful that Dr. Hill did not advise journeys in search of them. The Maritzburg Table Mountain was one of the places which had been mentioned to me, and amongst other statements I was assured when at Howick that a native practitioner who lived on this mountain had many clients, and was skilful in the cure of the disease. Dr. Hill caused inquiries to be made through the agency of a native constable who lived on the spot. They resulted in an assurance that there was no such practitioner, and there were no patients, with, however, the important addition that there was a man there who possessed the power of causing the disease.

The patient whom we visited lived in a large kraal on a hill in the Zwaartkop valley. His relatives were apparently well-to-do Kaffirs. They did not seem at first particularly glad to see us, but after a little demur we were directed to the hut in which the patient lived. I entered it, but found it—as well as a little fenced-off apartment on one side, evidently his bedroom—quite empty. Our fears of being disappointed of an interview were, however, soon dispersed by the discovery of the object of our search squatting amongst some bushes just outside. He was evidently much frightened, and would gladly have remained hidden. He was a man of about 40, and although revealing nothing in his face, his extremities were much mutilated. On his hands all the digits had been lost at the knuckle joints with the exception of the thumb, of which a stump about three-fourths of an inch long remained. Both his feet had apparently been amputated through the tarsus, and in both the os calcis and astragalus had been displaced backwards so as to disable him from walking. On both hands and feet the scars were perfectly sound, and had been so for many years. He was very dexterous in the use of the stumps of his hands, and astonished us by the facility with which he undid the strings which kept his boots on. He was accustomed to move about in the sitting posture. His ulnar nerves were harder than natural, and somewhat, but not greatly, thickened. Our endeavours to test sensation in different parts were to a large extent neutralised by the poor fellow's extreme trepidation. Neither bribes nor coaxing would induce him to permit a pin to touch his skin. We had to be content with ascertaining that his stumps were very defective in the perception of touch.

The history given was that in the Zulu war he had been a waggon-driver to the English forces, and that at the conclusion of the war his hands and feet were bad, and he was for a long time in a hospital where operations were done on his feet. His hands were several years before they healed. He had since his return home always lived with his people, and no other cases had occurred. He had been for many years in the condition in which we found him. His general health was quite good, and he did not appear unhappy. There had been no aggression of the disease for long, and it might, therefore, be considered a case where permanent cure had been attained, though of course without reparation beyond a certain point.

I am obliged to leave this narrative imperfect in several respects, because our patient gave very vague and very variable answers to our questions. As a Kaffir and amongst his relatives it was not to be expected that he would admit having eaten fish. Nor could we ascertain with any approach to accuracy when his first symptoms set in, or what they were. The narrative may, however, I believe, stand as one which the experience of many other South African cases would parallel. A man wholly free from hereditary tendency leaves his home, associates with Europeans, and becomes a leper. He returns to his kraal and there remains until the disease has run its course, without any definite precautions against contagion and without any spreading. There was, of course, no fish-eating in his kraal.

CHAPTER XX.

ON DENIALS OF FISH-EATING BY INMATES OF LEPER ASYLUMS.

In the cases in which the eating of fish is denied by individual lepers various explanations may be offered, some of which are applicable to some cases, some to others. In the first place the disease may have been acquired by inheritance or by commensal communication. To determine this it is necessary to enquire at what age the disease began, and whether there were any leprous relatives. Hereditary transmission is probably very infrequent, but the possibility of its occasional occurrence cannot be wholly ignored. Now, speaking broadly of those lepers into whose cases I had an opportunity of examining in Indian Asylums and who denied having eaten fish, it was certainly remarkable that in a very large majority one or other of these suggestions seemed applicable. Either the disease had commenced in early life, or there had been leprosy in the family. Concerning all these cases it is most important to bear in mind the very prolonged incubation periods (ten to twenty years) which are possible in leprosy.

Respecting the cases in which neither of these suggested modes of acquisition seemed probable, and in which the origin of the disease appeared to remain inexplicable, it may be remarked that the advocates of contagion are equally at fault with those who hold the fish-hypothesis. These patients almost invariably denied any known association with lepers, and very usually asserted that they had never seen a leper prior to the manifestation of the disease in their own persons. Very often their statements were corroborated by the fact that the disease was known to be exceedingly infrequent in the districts from which they came. To suppose that these had all been unwittingly exposed to infection is to suggest that the disease is contagious in a degree, and by methods which all experience obliges us to reject. If a man by a chance exposure, of which he knew nothing at the time, may acquire leprosy—that is by the breath or touch—what would become of the numerous attendants and others who daily associate with lepers in Asylums?

In the cases under consideration—those namely, in which grown-up and possibly middle-aged persons become lepers and yet deny that they have eaten fish—commensal communication, although not probable, is still a possibility. Lepers have been known to engage in trades (such as bakers or sweetmeat-makers, dealers in milk and the like) which must be admitted to be attended by some risk of food contamination even to their adult customers. Possibly this explanation may be held to cover all the cases referred to, for they are by no means numerous. I must, however, freely admit that I much doubt whether it does so. In some instances my impression is that those who deny eating fish well know that they are not speaking the truth. Although fish-eating is very general in India, and is forbidden only to small numbers of the strictest castes or sects, yet it is undoubted that in the minds of all a certain degree of merit is attached to vegetarianism. More especially when the leper realises that his disease is supposed to have resulted from indulgence of an appetite which is regarded as more or less blameworthy, there arises a temptation to deny any such indulgence, and once the denial has been made it must be adhered to. Thus I incline to believe that in a certain small number of cases the truth is not told. In a larger number it is very probable that the question is more or less misapprehended. When asked whether he has eaten fish the leper may not unreasonably suppose that the habitual use is intended, and he may feel justified in ignoring, indeed he may have wholly forgotten sundry chance occasions in which he had partaken of it. We must keep in mind that my suggestion is that a very small quantity, if it chance to contain the bacillus, may suffice, and further that a very long period may elapse before its effects are manifested. It is of some interest to enquire in those cases in which fish-eating is denied what are the reasons for abstinence which are alleged. If a leper admits that fish was an ordinary article of food in his home, that all his relations partook of it and that he alone abstained, it is unreasonable to attach much weight to his improbable statements.

If it is alleged that fish was not eaten because it was not obtainable, or could not be afforded, it may be concluded that the statements refer to its habitual consumption, for there are no places in India or elsewhere, where at some season of the year fish may not be had even by the poorest, and it is precisely where it is scarce and dear that it is likely to be eaten in bad condition.

After all, the number of lepers in the Indian asylums who deny having eaten fish is very small. I met with them chiefly in the Punjab, and at Agra. At Colombo every one admitted it, and so at Madras and Calcutta; with the exception of a single one in each, all were understood to admit it. At Purulia, with its five hundred lepers, Dr. Hahn told me that he believed all had eaten it, but we found on enquiry one man, a high class Brahmin, who denied it. When, however, we came to Tarn Taran (Amritzar) and Agra the statements were somewhat different. At Agra I had been told that many had never eaten it, but on personal enquiry only one or two could be produced.

It is also necessary to bear in mind that in India periods of scarcity approaching famine are not infrequent. During these times many individuals are driven to take articles of food which they would as a rule avoid.

In proof that where personal character is supposed to be, in any degree, at stake the denials of patients are not to be regarded with much confidence, I may relate an incident which occurred to me at Durban. I visited this Asylum in company with my friend Dr. Britwell, who had charge of it. Amongst the inmates was a stalwart Zulu. Now the Kaffirs in general, and the Zulus in special, have an antipathy to fish. Many of those who know them assert broadly that under no conditions will they touch it. Thinking that this man's prejudice might possibly have been modified by change in religion, we approached the subject by asking if he were a Christian. "No," he exclaimed with a strong expression of disgust. "Have you been accustomed to eat fish?" "No," again; "never!" with an expression of still deeper disgust. Meanwhile an Indian who had charge of the establishment and who had overheard our colloquy had stepped aside, and he forthwith brought for our inspection a sack containing fish and salt. The fish had been caught in the sea close by and were kept for the lepers' table. "Does this Zulu eat these fish?" we asked. "Oh yes, just like the others," was the reply.

At Nicodar (Punjab) a very singular experience awaited me. I had received at Calcutta an anonymous post-card, informing me that if I would go to Nicodar I should there find an Asylum "containing one hundred souls, not one of whom had ever in their lives tasted dried fish." On reaching Nicodar I was presented with a schedule, apparently very carefully prepared, by the resident medical officer, a native. This had been courteously prepared for me in consequence of a request forwarded by his Excellency the Viceroy that they would give me all assistance. It contained a schedule with a column as to whether any fish had been eaten by the patient whose name was given. In this column no fewer than forty men out of fifty-one were scheduled as having never in their lives eaten fish.

I discussed the question in much detail with the compiler of the report, but could not in any way shake his testimony. He said that he believed the men to be speaking the truth. I then asked that I might be allowed to interrogate them all, one by one, not allowing any to overhear what others had said. A man was produced who denied that he had ever eaten fish, and persisted in the denial, although he admitted that fish was plentiful in his village, and that his parents, brothers and sisters all ate it freely. Having taken this man's evidence I asked for the next, and was now informed that there were no more, and that the whole of the other thirty-nine now stated that they had been in the habit of eating fish. My companion the compiler could offer no explanation of this extraordinary change of front, and I can only suppose that it was due to the manner in which the question had in the first instance been put, and which had possibly led to the belief that sea fish or salt-fish was alone asked about. It is to be noted, however, that I had not personally had any communication with them, nor made any sort of explanation, not being able to speak a single word of their language. In this asylum there were seventy patients, not one hundred. Nineteen were women, and fifty-one men. Of the women who had denied eating fish, not one made any change in her testimony. I interrogated them all, and they all persisted in the denial, some with much emphasis and eloquence. In most of these, however, the disease had shown itself in early life, and was not improbably a result of commensal communication. I feel entitled to quote my experience at this asylum as proof that statistics furnished by resident superintendents and not subjected to personal examination are often untrustworthy. Had I not visited this Asylum myself I should have been obliged in all honesty to publish a detailed and apparently authenticated document which would have conveyed, as regards the fish-hypothesis, an impression exactly the opposite to the truth. I may perhaps be asked whether I was convinced by the admissions of the inmates of this Asylum that they really had eaten fish. Most certainly I believe that they had, but my belief is not based on their statements. My contention is that those statements, one way or the other, were quite worthless as evidence. The men had probably talked the matter over amongst themselves and had come to the conclusion that, somehow, in connexion with my visit it might be to their advantage to say that they had eaten fish. In precisely the same manner they had on the previous day supposed that it would be best to deny it. As regards the women who persisted in their denial, I may add, that they one and all accused their male relatives of having indulged in fish, but claimed for themselves that although they had prepared it for others they had themselves never eaten it.

CHAPTER XXI.

ON THE NECESSITY FOR CAUTION IN ACCEPTING EVIDENCE.

There is always a certain perception of discourtesy in setting aside a statement, whether oral or written, as being not worthy of credit. A cautious attitude of mind is, however, essential in an enquiry like the present. We must allow ourselves to believe firmly that only which we think to be probably true. When the improbability is great we must, without regard to the source from which the statement proceeds, take it with much reserve. Human testimony at the best is fallible, and it is often not in the least necessary to accuse our witnesses of intentional misstatement whilst suspecting them of error.

There is a pleasure in being definite and emphatic which leads many to make *ore rotundo* assertions when they ought to speak guardedly and confess to imperfect information. Worse than this, there is in some minds a pleasure in confutation which may lead to strong statements which are wholly unsupported by knowledge, but which at the moment may not be known to be definitely false. Had I felt myself under compulsion to believe all that I have been told, or that I have read, I should long ago have abandoned the fish-hypothesis of leprosy. That I may not seem wholly unjustified in the attitude which my mind has assumed in this matter, I will relate a few items of experience.

Many years ago, in reply to a letter of mine inserted in an Indian journal, Dr. D * *, a well-known authority, wrote that the facts as to the population of the Straits

Settlements were a confutation of my theory, for there the fishermen lived on bad fish and yet had no leprosy. At the time that this statement appeared I had under my care Colonel H., who had held official position in the district named. He was himself a leper, and he assured me that providing for the lepers had been a constant trouble. He said that he knew Dr. D * *, and that the latter knew the district, and that it was inexplicable that he should imagine that leprosy was absent.

Many similar statements respecting other districts will be found in the literature of leprosy, and most of them are not, I suspect, more worthy of credence.

I was at one time much interested in an attempt to ascertain the extent to which fish-food now enters into the ordinary diet of Englishmen. I consulted Dr. Letheby's "Cantor Lectures on Food," a work abounding in so-called statistics. Referring to those regarding the Metropolis, I found that Londoners eat much more fish than mutton, and that 4,200 tons were brought daily to Billingsgate Market. This seemed incredible, and on making a calculation I found that the carts necessary to distribute such a quantity would block all the adjacent streets, and prevent access to the Docks and to London Bridge. So I applied to Dr. Letheby himself, and asked if there were not some error in the figures which he had assigned as to the quantity. His first reply was that, as he was the sanitary authority of the City of London, all the records passed through his hands, and that I might rely upon their accuracy. I still expressed utter incredulity. Subsequently he informed me that he had looked further into the matter, and that the quantity ought to be 800 tons. Errors almost as gigantic have been proved to have occurred in the counting of lepers in Colombia and some other places.

The credibility, or otherwise, of those lepers who state that they have never eaten fish has been discussed in the previous chapter. These denials come chiefly from India, and from persons whose religious creed forbids, with greater or less strictness, the eating of flesh-food of any kind. The members of the Leprosy Commission in India, in recording denials of this kind, remarked that the fact that those who make them are forbidden to eat it by their religion lends support to their assertions. To my mind, perhaps somewhat too suspicious, it tends in the opposite direction, since it supplies a motive for falsehood. I have been assured by many persons who had enjoyed excellent opportunities for observation that a conscience for truth-speaking does not exist in the Asiatic mind, and that either with or without motive the most misleading statements are habitually made. This carelessness as to exact truth received an interesting illustration in a circumstance which was related to me by two members of the Commission. In a town in which a number of lepers had been collected for their inspection, the latter were asked in rotation a series of pre-arranged questions, the answers to which were taken down in tabular form. As the enquiry went on it was found that all were thirty years of age, all had suffered from the disease for seven years, and all had had an uncle who was a leper. Each one in fact simply repeated what he had heard his predecessor say. They were all forthwith turned out of the room, and subsequently brought back one by one, with the result, as my informants stated, that "our tabular records became less monotonous, but whether any more trustworthy might be in doubt."

Many instances might be related in illustration of the facility with which the testimony of individuals may be made to appear to support the view desired by the narrator. I have usually found that patients, when once aware of the significance which I attached to their admissions, were very reluctant to allow that they had eaten any suspicious kind of fish. Such admissions seemed to them to imply some sort of blame as to careless feeding, and to make them in some degree responsible for their maladies.

A soldier who had served in various parts of India came under my observation as a leper. In reply to my question, "Have you eaten much fish abroad?" he replied, "I eat it whenever I could get it, but that was not often." He subsequently consulted another London surgeon, to whom he gave such replies that in publishing the narrative of his case that gentleman thought himself justified in stating that the case confuted the fish hypothesis, for the man had never eaten any fish. I had subsequently the vexation of seeing the case quoted repeatedly in this sense in medical journals, and it still does duty in several medical works.

In another instance a sharp-witted boy of eleven, of English parentage, but himself born and brought up in India, had become a leper. I put my usual questions to his father, and was told that fish had been an ordinary article of diet in his family, and that this boy had been especially fond of it. The boy was subsequently admitted into one of my wards at the London Hospital. He had caught the idea that we attributed his malady to the fish he had eaten, and it was his pleasure to assure my house surgeon and dressers that he had never eaten any.

As an instance alike of the freedom of statement which travellers permit to themselves, and of the influence of preconceived opinions, no better can be quoted than a sentence which occurs in a medical report by Dr. K. C. It is published in Sir Harry Johnston's volumes. Dr. C. writes: "Leprosy is very common all over Africa in both forms, tubercular and nerve. As long as the natives disregard all forms of segregation this disease will continue to abound." Now, it is certain that in many parts of Africa leprosy is quite unknown; that into others it has been only recently introduced; that in other and very large districts it is exceedingly rare, whilst of yet others it is the fact that we possess no information whatever. Yet Dr. C. had been ten years a missionary in Nyassa-land.

The confident readiness with which travellers will also offer testimony as to the resources of the country they have visited and the dietetic habits of the natives is very remarkable. But too frequently their opportunities for acquiring information have been but slight, and, such as they were, have been by no means critically utilised. It is quite possible for an Englishman, not only to pay a flying visit but to reside for months or even years in a foreign country, and yet, unless he has made special enquiries as to what the peasantry eat and what diseases they suffer from, to remain in ignorance on these points or to form very erroneous impressions. We form our impressions from what we see, and but too often we see only that which is forced upon our attention. That which is behind the scenes escapes us. In the present enquiry the testimony of travellers is concerned with the two questions: Do the natives of the district eat fish? and Do they suffer from leprosy? Neither of these can be answered satisfactorily unless special enquiries have been made. As regards fish-eating, not only must the markets and shops be visited, but investigation must be made as to occasional importations and as to the varying conditions of supply during the dry and the rainy seasons. Not only is it possible for travellers to form very erroneous impressions as to the fish supply, but they may also make great mistakes as to the prevalence of leprosy. It is not in all countries that these poor creatures make themselves conspicuous as beggars or otherwise. Concealment, more or less successful, is much more common, and even residents may be quite unaware of their existence. Mr. Cantlie, recording his experience of the disease in China, has told us: "The great tendency is to disclaim leprosy as existing or arising in the district one inhabits; it is the same here in Hong Kong as elsewhere. Not only merchants, but several medical men have said to me, 'But there is no leprosy in this neighbourhood, is there?' and that, too, in the very home of leprosy."

Mr. Cantlie's observations on this matter receive noteworthy illustration in the case of Egypt. Casual visitors to Egypt never see lepers, and even those who have lived for years at its fashionable health-resorts will express incredulity as to its existence. Medical men have recorded opinions as to its almost entire absence. Yet more careful investigations place it beyond doubt that amongst the Egyptian poor there are fairly numerous cases. The malady has since the days when it was known as the "Egyptian disease" undergone great reduction, but it is by no means extinct. The same is the case in South Africa. During my tour in Natal I should not have been able to find a single case had I not had, at the instance of the Government, the assistance of the local authorities. A large majority of the inhabitants of Cape Colony are quite unaware of the existence of leprosy in their midst.

Is it premature to suggest that leprosy investigation has now reached a stage in which the tendering of merely hearsay evidence should be avoided? Those who record their experience in the future should do so with a sense of responsibility, and should be prepared to state in detail the extent of the enquiries which they have made.

CHAPTER XXII.

ON THE DISAPPEARANCE OF LEPROSY BEFORE ADVANCING CIVILIZATION.

We may note that during the last ten years there has been a decided advance in general opinion as to the causes of leprosy. The number of those who are out-and-out contagionists has greatly diminished, and although that of those who have openly accepted the fish-theory is still but small, the general trend of thought has undoubtedly been in that direction. On all sides we now hear that leprosy is a disease which disappears before advancing civilization and attention to general sanitation and hygiene. These expressions are used by men who think it a part of philosophic caution to decline to bind themselves to a narrow creed. Surely, however, it may be asked whether it is worthy of the science of the twentieth century to conceal its ignorance under such generalities. That leprosy does recede under many conditions of advancing civilization is quite true, but it by no means invariably does so. The West Indian Islands, Spain* and Portugal, and Cape Colony are exceptions to such a law; and if it were more absolute than it is, surely we ought to be able to specify the precise element in civilization which exerts this beneficial influence. That it has nothing to do with personal cleanliness, with house-accommodation, or with an abundant supply of wholesome food, is made certain by a thousand facts.

---

* It is estimated that up to recent times the number of lepers in Norway and Spain has been about equal. To each country a total of 1,200 was assigned. Yet how different are the conditions of life in the two countries. In Norway it is the poorest class—fishermen and peasants of a certain limited district—who suffer. In Spain all classes find their victims. Norway makes salt fish, and the Spaniards (Catholic) eat it. In the harbour of Bergen there are always ships loading with salt-cod for the Spanish market.

Although leprosy affects chiefly the poor, it is in no way essentially connected with poverty. The advocates of the fish-theory allege broadly that the one factor of importance to its prevention is the disuse of badly-preserved fish, and they suggest that, unless exceptional conditions exist (such, for instance, as the fast-day observances of the Roman Catholic Church), the general influence of advancing civilization is such that, by supplying other articles of food, it diminishes the consumption of the kind of fish referred to. They assert that the better cultivation of cereals and the introduction of root crops, potatoes, &c., combined with the abolition of the fast-days, effected the extinction of leprosy in the British Isles and the greater part of Europe during the centuries immediately following the Middle Ages. Similar forces are, they believe, at present influencing its prevalence in many other parts of the world. It is on record as regards British Guiana that the consumption of salt fish per head of the community, which was 78 lbs. in 1849, was only about 28 lbs. in 1898, and if the records were forthcoming we might very probably be able to chronicle a similar reduction in many other places. The supply of fish is not unlimited, and the mere increase of population in many places changes the position of salted fish from that of an article of daily use to one which is only employed exceptionally.

I am often asked whether, if it were admitted that tainted fish were a cause of leprosy, it would not still remain a possibility that other forms of bad or decaying food might have the same effect, such, for instance, as rotten meat or putrid vegetables. My reply to this is that most undoubtedly there is a possibility, but that I am not acquainted with any facts that make it seem probable. Many savage nations habitually eat the flesh of mammals when in a decomposing condition and yet escape leprosy, and the same may be said of milk, and of all kinds of grain and fruit. The Kaffirs of Natal are notoriously willing to eat the flesh of cattle which have been found dead and are putrid, yet they had no leprosy among them until they came in contact with the salt-fish of Cape Colony. Nor do I know of any well-sifted evidence calculated to show that the fish-hypothesis does not easily cover the whole of the ground. Leprosy is such a definite and well-specialised disease that we may accept it as highly improbable that its cause should be other than a quite restricted and definite one.

In a review of the Roy. Coll. Physicians Report on Leprosy (1866) in vol. xxxix. of the *British and Foreign Medico-Chirurgical Review*, it is stated that "the only very general conclusion founded on a wide induction that seems to be warranted is, that bad food, and perhaps some particular kinds of food, such as putrid fish, putrid meat, mildewed grain, filthy habits—in brief, whatever predisposes to an unsound state of health—may favour its production, and, *vice versâ*, a conclusion which seems tolerably to accord with what we learn from history, especially that of Europe, that, as civilization has advanced, as the sanitary state of the country has improved, the disease has been checked, if not altogether put an end to." This, although true for the most part, is not always so. Leprosy has little or nothing to do with the sanitary state of the country. Those lowest in the scale of civilisation have no leprosy, and at the present day those highest are also usually exempt. The former have not learned to cure fish at all, and the latter have learned to cure it well.

Dr. G. H. Fox, of New York, a physician who has recently written with much intelligence about leprosy, takes, if I am not mistaken, a very exaggerated view of the connection between that disease and the evils which attend poverty and ignorance. He writes: "I have yet to learn of any instance where leprosy has ever obtained a foothold in, and spread through, an intelligent and civilized community." Well, in Cape Colony it obtained foothold amongst intelligent Dutch farmers, and it still affects that race. In Colombia and several other places it is reported to have had as its starting point a Roman Catholic priest. The inhabitants of China, Japan, India and Burma can hardly be described as either unintelligent or uncivilized, nor was there, perhaps, any very startling difference in these respects between the days when leprosy prevailed over Europe and the present in which it is nearly extinct. The Jews of Jamaica are surely both civilized and intelligent, and so were their forefathers in the time of Moses. Civilization and intelligence are words which, it may be admitted, are difficult to define. If under "civilization" we may include efficient attention to fish-curing, and by "intelligence" sufficient refinement in dietetic taste to refuse to eat that which is decomposing, then I have no doubt that Dr. Fox is right. If these be not included it is easy to confute him.

Dr. Fox, from whom I have just quoted, had visited the Sandwich Islands, and he informs us that the natives have not the remotest idea of personal cleanliness, and that "they obtain their food by dipping their ulcerated fingers into a common dish." It is obvious that this habit—one which is shared by many other primitive races, Kaffirs, &c.—may well explain the propagation of leprosy by what I have termed "commensal communication."

Dr. Freeland, writing of Antigua, states: "The natives, or negroes, as a rule do not use knives or forks, but dip their fingers into the food."

Dr. Planc, reporting on leprosy in the North West Provinces of India, said that "it was so diffused that it was difficult to entertain the idea that local conditions had any influence in causing it. It was most common at Kumaun, Ghurwal, and Banda. It was a disease of man specially as distinguished from woman, not peculiar to persons of any employment or religion, and affecting, in almost equal proportions, the well-to-do and the poor."—*British and Foreign Medical Review*, vol. lx., 1877.

It is a favourite suggestion of some who, whilst they still adhere to the doctrine of contagion, yet recognize some of its difficulties, that there are probably certain antecedent and predisposing conditions in the recipient which are necessary in order that the virus may be effective. These they think may be supplied by poverty and neglect of personal hygiene. In this way they explain the repeated failures of attempts at artificial inoculation, and the fact that of the numbers who are freely exposed to risks of contagion so few become lepers. Amongst the predisposing influences which are suggested, poverty with its attendant hardships stands foremost. Now it is perfectly true that in most countries in which the disease prevails the poor suffer in great excess over the rich. This does not, however, imply that they are more prone to it. It is, indeed, very easy to show that poverty *per se* will not produce leprosy, and equally so to prove that wealth and comfort will not protect from it. From the days of Gehazi onwards there have been abundant examples of not only king's ministers but kings themselves, priests, and men in all stations of life who have become lepers. The most deeply poverty-stricken race of men on the earth were probably the aborigines of Australia, but they had no leprosy. In the West Indian Islands, although it may be said that there is poverty, yet it is unattended for the most part by the hardships which, in less fortunate climates, are its concomitants.* There is plenty of leprosy, and we are told that in some of them it seems to affect rich and poor equally. Nor is there, I feel sure, any justification for the belief that defective stamina or low general health in any material degree predispose to leprosy. It is quite certain that in many instances it attacks those who are apparently in excellent health. The cases which occur in Europeans who have gone to reside in leprosy districts are almost invariably examples of this. Not infrequently those who are attacked continue to enjoy good bodily health. This is exemplified in the cases of several Boer farmers now in confinement on Robben Island. These men have never been subjected to any hardship or deprivation, were in excellent health at the time they were attacked, and remain so still. The same statements are true of many lepers now resident in London and Paris.

Hansen's discovery of the lepra bacillus, if, as I have ventured to suggest, it has led us astray by giving apparent support to the belief in personal contagion, has at any rate helped us to greater precision of creed in other matters. We now see clearly that leprosy is for the most part and under many circumstances quite certainly a specific disease, attended by a parasite which is capable of transference from one person to another. In denying contagion we deny only that the parasite in question can be communicated by the breath or the touch, but we admit most definitely that it may be communicated by the food.

---

* Respecting Jamaica we are told: "Persons residing in the best dwellings and in the worse appear to be equally liable. The cleanliest and the dirtiest appear to suffer equally. The Jews, who are very cleanly in their habits, appear to suffer most. The Jews and coloured people generally consume a large quantity of fish, as also of salted and kippered fish."—Dr. BOWERBANK.

I quote the following from the *Dublin Journal of Medical Science*," (vol. xciv. 1892) :—

"In a recent issue of the *New York Medical Record* (1892) appears a letter on this subject from Dr. Crane, lately Government Physician in Hawaii, which seems to show that Dr. Hutchinson's theory of the connection between leprosy and a fish diet is not supported by Hawaiian experience. He says:—'From time immemorial the staple food of the native Hawaiians had been fish, and principally raw fish. Until about 1860 there is no history nor tradition of the existence of leprosy among them.* At about this date it appeared, and at the time of its appearance white people had been among them for forty years, and their food and methods of living had greatly changed. Canned food, fresh meat, and vegetables had been so widely introduced, that the use of fish, and especially raw fish, had been enormously decreased, and could not be considered as a prominent feature of their diet. At the present day, while consuming no remarkable amount of sea-food, one Kanaka out of every thirty is a leper. All fish, no leprosy; little fish, much leprosy. This has been the history in Hawaii.'"

The explanation is easy. The change has been in the quality of the fish. Formerly it was eaten fresh and raw, now it is salted. A factory for the salting of fish was set up just before the epidemic prevalence of leprosy in these Islands occurred.

At Malmesbury (Cape Colony) Dr. Roux, the medical officer of health for the district, was good enough to take me to the principal shop where fish was sold. It was all in the salted or dried states. We were told that all the farmers in the district bought it, and that they usually came once a fortnight for a supply for their servants, buying, according to the number of the latter, from 100 to 500 pieces at a time. The "sack-fish" was sold in pieces from 11*s.* 6*d.* a hundred to 12*s.* 6*d.* or more. By calculation we found that this was at the rate of threepence a pound, or rather more than a penny-farthing per piece of nearly half a pound. These prices refer to the fish called Kabeljowe, the cheapest and the one in most request. It is a fish not much eaten in the town of Malmesbury itself, but supplied for the use of farm-labourers. We were allowed to inspect large consignments of this fish, some in sacks and some in tubs, and the process of its manufacture was described to us. That which we saw was in large lumps of about half a pound, and was still moist and encrusted with half dried salt. It readily broke up into large flakes. It had a strong fish odour, but was not as yet undergoing any decomposition. We were told that it was from two to three or four weeks old, and that it would keep good for a month or more. If kept too long it would dry, but, as our informant thought, not decompose. In this opinion he might be wrong, and the question of its drying or softening might depend much upon the conditions under which it was kept. We were told that this kind of fish had never been put into brine other than that made by its own juices. The fish when caught would be eviscerated and cut into pieces. These pieces would be put into a tub with plenty of salt on them, and after three or four days, when the juice had left the flesh, they would be changed into another tub and again dry salted. After this second salting, the sooner it was sold the better, and at the end of a week it would be put into sacks and sent inland. The fish which we saw had come from Hermanus-petrusfontein, a fishing village on the south coast, not far from Caledon (a noted leprosy district). Asked why they did not now get their fish from Saldanha Bay, the reply was that they could not get a permit. In times of peace Saldanha Bay had been their source of supply. There had been cases in which a consignment of sack-fish had been suspected not to be good, and Dr. Roux, as Medical Officer of Health, had been summoned to inspect it.

---

* This is an erroneous statement. It has been established that leprosy existed in the Sandwich Islands before the advent of Europeans. It prevailed, however, only very sparingly, a circumstance quite inconsistent with the belief in contagion.

The store-keeper confirmed what we had recently heard, that the supply of "snook" had fallen off of late. "Snook" he considered too good a fish for the food of labourers, and said that it was formerly bought for their masters' own use. The fish above described he knew as "geelbeck." He kept also a better class of dried and salted fish, which was hung in strings and quite dry. It was known as "brockens." This he obtained from Cape Town (where I had seen plenty of it). Thus it will be observed that we obtained abundant proof that in the Malmesbury district, which has always been a noted centre for lepra, the consumption of the most suspected kind of fish has been, and still is, large; and further, that it has been supplied for precisely that class — the agricultural farm-labourers— which affords the greatest number of lepers. Malmesbury is a wheat-growing district, and it is especially during harvest time that the consumption of salt-fish is large. (See extracts from Dr. Gilchrist's Reports, on a subsequent page.)

I visited in Cape Town a large fish-curing establishment, the proprietor of which obligingly answered all my questions and showed me over his factory. He said that he considered that the fish-curing was done at the fisheries and not by him, but he had large brine vats in which fish was stored. He was accustomed to receive some in a half-salted condition. The vats which he showed me were full of segments of large fish steeping in a strong, thick, coffee-coloured brine. It was destined to be taken out and allowed to dry, and would then be sold in sacks to the farmers. My informant said that he could sell any quantity, and that the farmers for economy's sake preferred to buy it wholesale. It was always good, he said, when it left his warehouse, but he had no doubt that after reaching its destination it was often overkept. It ought not, he thought, to be kept longer than a fortnight. He had plenty of dried fish of better kinds, Cape salmon, brockens, &c., but that in which I was chiefly interested was the cheap kind, and the one chiefly supplied to country districts. This method of salting in brine differed from that which was subsequently described to me at Malmesbury, in which the salt was applied without water. The difference is, however, only a matter of degree, for in the dry method the juices of the fish in the first instance dissolve the salt, and make a kind of thick brine. Nothing can be more clear than that in both methods the cheapness of salt must exercise an important influence on the efficiency of the curing process. It is further to be clearly understood that if such fish were to be kept too long it might either dry up, or decompose and soften. It is probably the process of softening which it is desirable to investigate, and which constitutes the real danger.

It cannot be too clearly insisted on that fish-food of the kind supplied by Cape Town and Hermanus-petrus-fontein, and eaten at the South African mines and by the Colonial farm-labourers, is absolutely unknown in England, and most other well civilized parts of the world.

To recapitulate, then, I may venture to state as follows: Civilisation as a whole does not necessarily influence the prevalence of leprosy. Sometimes it increases it, but more commonly it tends to diminish it. It is clear, then, that there must be some special element in the advance of civilisation which tends at one time in favour of the disease and at another is adverse to it. The introduction of fish-curing as a new art may cause increase, and the developing of roads, especially of railroads, may favour its spreading. On the other hand, improved agriculture by supplying other articles of food, and an increased supply of sound salt as favouring better curing of the fish, may tend to diminish or even to exterminate it.

CHAPTER XXIII.

FISH-CURING IN CAPE COLONY.

Dr. J. D. F. Gilchrist, a very able naturalist, has for some years held the position of Marine Biologist to the Agricultural Department of the Cape Government. It is from his annual reports that I take the following extracts. They refer to the years 1896—1899 (inclusive). It is to be observed that his object in view was rather to encourage fishing and fish-curing than to supervise the industry in reference to health. No suspicion was then entertained that badly cured fish might prove injurious, much less that it was a cause of leprosy. One fact comes out very definitely from Dr. Gilchrist's comments. It is that there is a great demand for salt fish on the part of the Cape farmers for the supply of their labourers. We are sometimes told, and truthfully, that more fish is eaten in England than in Cape Colony. It may be asked, however, whether any English farmer ever thinks of buying salted fish wholesale for his labourers at harvest time. In England and throughout Central Europe fish, with the exception of herrings, has become so expensive that it is obtained for the most part only by the well-to-do, and eaten only in good condition. Our labourers rarely get it, and if they do, it is always sound. We have no such article as the pickled (slightly salted for temporary preservation) fish to which Dr. Gilchrist repeatedly alludes.

Price and Condition of Fish in Johannesburg. (1896 ; p. 27.)

"Information has been received which has some bearing on the possible market for fish. In Johannesburg the fish are, it has been said, received in a bad condition owing to inadequate means of transit. Even in this condition they command a high price, as, for instance, soles, which are sometimes sold at 8*s.* a pair. I have also been informed by a leading fish-dealer there that there is an unlimited sale especially for fresh fish there."

It is Johannesburg, I may here remark, that is under much suspicion as a focus of origin of leprosy and its supply to the rest of the Transvaal and to Natal. Kaffirs and others from all parts flock to the mines, and on their return home a few of them develop leprosy.

MOSSEL BAY. (1899; p. 8.)

"A canning factory and fish-curing establishment exists at Mossel Bay. It is said that some of the less energetic of the local fishermen instead of going out for their daily fishing prefer to pick up the fish-heads thrown away from the trawler's catch."

ITALIAN FISHERMEN AT CAPE TOWN. (P. 10.)

"A number of Italians have recently congregated at Cape Town. At first engaging only in the crawfish industry, they now catch great quantities of the geelbeck, a valuable fish. 'Their fishing ground is round Robben Island, from which they put out set nets in every direction.' The Cape Town Malay fishermen objected to the Italians, and a deputation waited upon the Government requesting the prohibition of the Italians from fishing. The Malays were very properly advised to combine and adopt effective measures for procuring a plentiful supply of fish."

LAMBERT'S BAY (CLANWILLIAM, NORTH OF ST. HELENA BAY).
(1897; p. 106.)

"Fish-curing is not carried on on a large scale; it is mostly pickling."

(1898; p. 200.)

"Fish are sent to Cape Town, but the largest amount are disposed of in the district."

(1899; p. 21.)

"All the fish are usually bought by Messrs. Stephan Brothers, who have exported a little snoek to Mauritius, where they fetch about 1*s.*

each. The usual methods of curing fish by salting are carried on, and there have been no improvements in this direction."

STEENBERG'S COVE. (1897 ; p. 106.)

"Snoek is fairly abundant, and is generally sent to Mauritius."

(1897 ; p. 200.)

"There have been no improvements in the methods of catching and curing fish.

"About ninety-five tons of fish were sent to Mauritius during last year."

(1898 ; p. 21.)

"Fish are generally bought by farmers and fish-riders. One hundred and fourteen tons were exported to Mauritius. There have been no improvements or alterations in the methods of catching or curing fish."

These references to Mauritius are of interest, for leprosy prevails there, and has, it is believed, much increased since the importation of salted fish from the Cape became common. That which goes to Natal is supplied for the most part to the Indian coolies. I met with it (in bad condition, "sack fish") in the store of an Indian merchant at the foot of the Drakenberg far inland in Natal.

STOMPNEUS AND BRITANNIA BAY. (1897 ; p. 107.)

"The largest amount of fish is salted and sun dried. A large quantity of dried fish are sent to Mauritius market (such as snoek, geelbeck, kabeljaauw and stock-fish), where there is a great demand for them.

"Harders, bokkom harders, white stumpnose, galjoen, and hottentot, which are all pickling fish, are sold in the Colony. The fish which are dried are snoek, geelbeck, kabeljaauw, large steenbras, large hottentot, and 'bokkoms.' Those which are salted and pickled are: harders, stumpnose (white), maasbankers, galjoen, elft, springers, snoek, hottentot, and steinbras."

(1898 ; p. 201.)

"Dried snoek and geelbeck are exported to Mauritius and Natal.

"Snoek to the amount of 167½ tons was exported to Mauritius and Natal during 1898, showing a decrease of twelve tons as compared with the previous year.'

(1899; p. 21.)

"The increase in the number of snoek caught is over fifty thousand.

"The fish are chiefly bought by farmers and fish-hawkers. There has been an increase in export of snoek. During the year 1898 167½ tons of snoek were sent to Mauritius and Natal, while during the past year 278 tons have been sent to the same places."

PATERNOSTER (NEAR ST. HELENA BAY). (1897; p. 108.)

"Fish-curing is carried on here extensively, and the methods generally used are drying and pickling. Dried snoek is generally sent to the Mauritius market; harders, 'bokkoms,' etc., to the Cape Town market, always finding a ready sale. A great part, however, is sold out of hand here to meet the wants of the farmers in the vicinity."

(1898; p. 201.)

"There have been no improvements or alterations in the methods of catching and curing fish.

"Five hundred tons of snoek have been exported in 1898 to Mauritius and Cape Town. The remainder was sold in the district."

(1899; p. 22.)

"There was a slight decrease in the number of snoek caught this year. There is a great demand for fish on the part of the farmers and fish-riders supplying the surrounding country. The prices have risen. Ninety-two tons of snoek were sent from this port to Mauritius this year as against 500 tons last year. Some were sold to farmers and fish-riders."

LANGEBAAN (SALDANHA BAY). (1896; p. 109.)

"Fish-curing is carried on to a pretty fair extent, but only in pickling. The fish used for this purpose are harders, 'bokkom' harders, steenbras, stumpnose, and galjoen."

(1897; p. 202.)

"There were no improvements or alterations in the methods of catching and curing fish.

"The fish have been disposed of in the Malmesbury district."

(1898; p. 23.)

"The fishing has been better this year, and the prices obtained are about the same. This place supplies chiefly the farmers in the Malmesbury district, and there is great demand, especially during the harvest season, for fish for farm labourers."

At Malmesbury, amongst the farm labourers there are a certain number of lepers; not many, and probably fewer than there were formerly. In a fish store which I visited there, I met with "sack fish," but it was by no means in bad condition.

KALK BAY (FALSE BAY). (1897 ; p. 109.)

"The fishing has not been so good during 1897 as in the previous year. The fish caught are sent to the Eastern Province, Western Province, Free State, Transvaal, Bechuanaland, Namaqualand, Natal and Mashonaland, and there is a great demand when Government Railway deliveries are up to time.

"All methods are used for curing fish, and all fish are used for this purpose."

(1899 ; p. 24.)

"The fish are readily bought by fishing companies and by carters, but there has been since the war a total absence of any trade with Johannesburg and other such places to which great quantities were formerly sent."

Here we have important testimony to the large supply to Johannesburg during the times prior to the war.

SIMON'S TOWN (FALSE BAY). (1897 ; p. 110.)

"The fish are sent to Cape Town, Johannesburg, Kimberley and other parts of the country. The only fish cured are harders, which are sometimes salted."

HERMANUSPETERSFONTEIN. (1897 ; p. 110.)

"The methods used for curing are known as 'flecked snoek,' 'geelbeck-biltong,' and 'mooitjes.' Smoking and pickling are carried on in the neighbourhood."

(1898 ; p. 24.)

"A greater demand by local buyers and from the districts of Malmesbury, Paarl, Worcester and Robertson. No fish are exported from this locality."

All the places here named are known as haunts of leprosy. According to Impey's statistical table recording the admissions to Robben Island: Malmesbury sent 45 out of a population of 23,000; Paarl, 28, population 21,000; Worcester, 6, population 12,000; Robertson, 5, population 11,000.

STRUISS BAY (NEAR CAPE AGULHAS, BREDASDORP). (1897; p. 111.)

"The methods used for curing are salting and drying, the fish used for this purpose are geelbeck, kabeljaauw, steenbas, stumpnose, roman, seventy-four, elfts, harders and galjoen."

(1899; p. 24.)

"There is an immense demand for fish by the inhabitants of this village and district of Bredasdorp, and by the farmers of the Robertson and Montagu districts."

For some reason, the explanation of which must be sought on the spot, the little province of Bredasdorp has a low average of leprosy. Robertson, however, suffers rather severely.

MOSSEL BAY (DISTRICT OF MOSSEL BAY BETWEEN RIVERSDALE AND GEORGE, NEAR THE MOUTH OF FISH RIVER). (1897; p. 112.)

"The methods used for curing are pickling, drying, and a little smoking; the fish used for curing by the latter method are kabeljaauw, and by the former all kinds."

(1899; p. 25.)

"They are generally bought by the farmers on the beach and by Mossel Bay people."

PLETTENBERG BAY (HALFWAY BETWEEN CAPE AGULHAS AND ALGOA BAY). (1897; pp. 113, 114.)

"The fish caught here are sold locally, and taken to supply the labourers at the steam saw-mills, about twelve miles distant. Salted fish are sent to Uniondale and Willowmore."

(1899; pp. 26, 27.)

"The only method of curing is by salting. Geelbeck is cured in a particular way, viz., stripping the meat from tail to head in strips from about two to three inches. In this condition they are termed 'mootjes.'

The seventy-fours are cured in a different way, being cut open from the back and salted down. This is termed 'flecked fish.'

"I have every reason to believe that the unsatisfactory manner in which the fish are salted and cured, especially the process of drying, has to do with the unsatisfactory realisation of shipments, also getting the shipments away, and having to ship by a steamer carrying creosoted sleepers, which is reported to spoil the taste of the fish shipped."

BUFFALO BAY. (1897 ; p. 113.)

"The fish caught here find a ready sale within the district, and a few are sent to Uniondale. A little drying is done, and the fish used for this purpose are geelbeck, silver-fish, and kabeljaauw."

KNYSNA RIVER AND BUFFALO BAY. (1899 ; p. 25.)

"A greater number of fish has been caught this year and there has been an increase in their size. The demand for fish by the farmers in the district has increased, and prices are about the same."

The Knysna province, out of a population of 7,000, sent to Robben Island three lepers (see Impey's table).

ALGOA BAY. (1897 ; p. 118.)

"The fish are sent to Johannesburg, Kimberley, Free State and Cradock. There is nearly always a ready sale for them, but at times the market is overstocked.

"Fish-curing is not carried on to a great extent. The methods used are salting, drying, and smoking. A small quantity is pickled, the fish used for this purpose being geelbeck, kabeljaauw and silver-fish."

INSTRUCTIONS IN CURING OF FISH. (1897 ; p. 120.)

"Some attention has been given to the methods of curing fish with the hope of increasing the demand for it, and Dr. Gilchrist tells us that several pamphlets have been published and distributed dealing with this subject, as well as information supplied by special request. There has been, and is still, a good deal of defective smoking, canning and curing of fish generally in the Colony, due merely to want of knowledge of the processes, and doubtless these instructions will bring about some change in this direction in some localities."

This last extract is valuable as giving a hint as to what should be done. Let the fish-curers be well instructed and also well threatened. Let them realise that their trade will be contracted unless they improve their methods. If they are told that badly cured fish causes leprosy they will see that the demand for it will fall off if they do not give more attention to it.

To these quotations I append a letter received from Dr. Gilchrist during my stay in Cape Town.

"DEPARTMENT OF AGRICULTURE,
"CAPE TOWN,
"*December* 27th, 1901.

"DEAR SIR,—The following facts which I have ascertained may be of interest to you.

"The Western Province farmers provide their labourers to a very large extent with fish-food, while those of the Eastern Province use 'mealies' (Indian corn) for this purpose. These last do not grow well in the West. There is a much greater prevalence of leprosy in the West than the East, I believe.

"Mr. Versfeldt, district surgeon, Stellenbosh, some fifteen years ago, was strongly of opinion that the fishermen at Somerset West got leprosy by eating bad fish.

"I have been told that the 'eengelegte' fish is often made out of fish which have gone bad and which can only be used by the addition of curry, cloves, and vinegar.

"'Eengelegte' fish is made by salting it, boiling it, and thereafter treating it with onions, cloves, and vinegar.

"'Mootjes' are small pieces of fish cut up for salting, and are a common article of food amongst the farmers of the Western Province.

"I should be glad to receive any publications you may make on this interesting subject and shall at all times be pleased to forward any information I may procure.

"Yours faithfully,
"J. D. F. GILCHRIST."

I feel sure that no one can have read the extracts which I have given above, without having become impressed with the fact that on the supposition that bad fish can cause leprosy, the prevalence of that disease in South Africa is well explained. Such fish has been spread sparingly over the whole country side, and leprosy occurs sparingly sprinkled over the same areas. The fish has Dutch names, and is supplied chiefly to Dutch farmers for the consumption of their farm labourers, and it is the Boer farmers and their labourers who chiefly populate Robben Island. The fish goes also to the mines, and in out-lying places, such, for instance, as Natal, it is almost invariably those who have been to the mines who become lepers. The fish is also exported to Mauritius, and in Mauritius leprosy abounds.

CHAPTER XXIV.

ON THE IMPORTANCE OF SALT.

If pure salt could be made common and cheap all over the world, I do not doubt that we should soon witness the extinction of leprosy. Salt is said to be destructive of the bacillus and, however that may be, it is quite certain that it prevents the decomposition of fish. Well-salted fish is perfectly safe, and nothing hinders that all fish should be well salted except the scarcity and dearness of the article. A development of the salt-trade and the introduction of better kinds have often been coincident with the decline of leprosy in a very marked manner. One great difference between Northern and Southern China is that in the one salt is abundantly produced, and is an article of export, and in the other it is imported and subject to a tax. In the latter leprosy is abundant, and in the former it is unknown.*

Yet in spite of facts which ought to be obvious to all, as to the importance of salt in reference to public health, we still have a salt-tax in India. That there should be one in China is perhaps more excusable, and it is greatly to the credit of the intelligent Japanese that none exists with them. During the financial pressure of the present war a tax on salt was part of a budget presented by the chancellor of their exchequer, but even under these conditions of pressure it was refused by the House of legislature.

---

* It is hardly too much to assert that the prevalence of leprosy in China is due quite as much to the heavy salt tax as to the dietetic habits of the community. In the non-leprous districts the tax falls on an export, and consequently cheapens the article; but in the leprous south it falls on an import with, of course, the opposite effect. No considerable quantity of salt can be moved anywhere without a permit.

The importance attached to the supply of salt in bygone times may be illustrated by the fact that some of the oldest trade-routes in the world were for its conveyance. The Phœnician merchants ranked both salt and salt-fish as important articles of commerce, and the ancient trade with the southern coast of Russia was in connection with the salt-pans at the mouth of the Dnieper and the salt-fish there prepared.

Not only should the supply be abundant but the quality should be carefully attended to. In the fish curing establishments on our own coasts this is a matter which has long received recognition. It was even deemed worthy of regulation by law. The mixture of other ingredients with the sodium chloride may cause deliquescence, and much impair the preservative qualities of pure salt. Salts of magnesia and of lime have this influence as well as that of making the condiment less palatable.

The craving for salt in some from, which is almost universal, is probably an indication of its value. It has been calculated by physiologists that the daily allowance of salt for an adult man should be from three to four hundred grains per diem.* This includes the whole taken, and as a considerable quantity is supplied in the food itself, it is probable that an addition at table of from one to two hundred grains may be sufficient. Where salt is taxed and dear it is probable that many have to be content with much less. In India it is certain that much of the salt is not good. It is either diluted with earth or sand or contains other ingredients. Some of it is black from such admixtures.

---

* Mr. Barrow, who visited China early in the last century, tells us that he estimated the stacks or hills of salt (prepared for exportation) at Tientsin to contain six hundred million pounds. As has been seen at Tientsin there is no leprosy.

The following extracts from Day's "Indian Fish and Fishing," in Volume II. of the Literature of the International Fisheries Exhibition (London, 1883), convey the opinions formed by one who had enjoyed large opportunities for observation.

(Page 445.)

"As a general rule, inland places having no special facilities for carriage do not receive uncured sea fish in a wholesome condition upwards of ten miles from the beach where they were landed. Should, however, the fish be first opened and cleaned, some salt rubbed in, and care taken in their conveyance (as warding off the sun's rays), they may be carried considerably further. But salt being very expensive, is seldom employed for this purpose, or else a very slight amount is used, and putrefaction has often set in prior to the fish being disposed of for human food. It is only prepared or stored at large centres of population, and at such localities a ready market exists for all the fisherman's captures." . . . "In some localities small fish are first buried in the sea sand, in order to obtain a little saline substance, and subsequently sun-dried. In damp weather such articles rapidly decompose, while in the hot months they are attacked by innumerable insects."

(Page 450.)

"In Bengal excised salt appeared never to have been employed for fish-curing, and the fisheries were in a neglected state; or, as observed by the Collector of Balasore: 'Fish sold in the markets are so stale that no European could touch it, and most of it is putrid. . . . The people in this district do not salt their fish, they dry it in the sun, and eat it when it is quite putrid. They like it in this way, and there is no reason why they should be interfered with.'"

(Page 451.)

"Along the coasts of Beloochistan, where there was no salt tax (1873), large communities were entirely supported by fisheries, their captures being cured and exported for the Indian or Chinese markets. The same remark applied to the Portuguese settlements of Goa, Daumaun, and Diu, the salt there costing about threepence per 82$\frac{2}{7}$ lb. weight, whereas in the contiguous British territory it stood at the salt-pans at about four shillings. Hence the foreign fishermen were able to freely use this condiment, the cured article was preserved in a superior manner, more wholesome to the consumer, and able to be carried further inland."

(Page 453.)

"The reason why the plentiful harvest of fish in the sea remains ungathered is not due to the apathy of the fisherman, or the unwillingness of the general public to be consumers of fish, but it is solely a result of the cost of salt, and that due to the Indian salt tax, a condition of things which it is hoped is being slowly ameliorated."

(Page 461.)

"Although following out the condition of the fishermen in various districts must have rather a sameness, it will be necessary to do so in order to clearly see whether these people are really in a prosperous or in a poverty-stricken condition: whether, in short, it is the case that they are in the utmost misery, not due to their own laziness, but as a result of British legislation imposing prohibitory duties on salt. . . . In Rutnagiri the practice of salting fish has decreased during the last fifteen years, in consequence of the increase in the price of salt, but the fishermen are said to have increased. . . . The official from Kanara gives a similar reply. The Commissioner observed that at present no larger number of men are engaged on fisheries than are required to provide sufficient for local consumption. The practice of curing fish has to a great extent diminished, owing partly to the falling off in the amount usually captured, and also the duty charged on salt in British territory. . . ."

(Page 463.)

"Passing to Burmah with its cheap salt, we find the sea fishermen well off."

(Page 464.)

". . . Fish salted with taxed or monopoly salt is a luxury for the rich, the sick, and for export: but such as is prepared with salt-earth keeps badly, and predisposes to disease."

In Morris's "History of the Godavery District," 1878, (p. 76), after giving a list of the fish, the author quotes the following paragraph from Dr. Day in the "Proceedings of the Madras Government Revenue Department, 4th February, 1869:—

"At Cocanada there are about forty fishermen who formerly resided within the limits of the municipality, but as their absence was considered desirable, they were presented with a suitable piece of land on which to erect their village. They consider the best season for sea-fishing commences about December, and although they salt fish, it is not of a good quality. They collect the saline effervescence from the marshes, and into this they put small fish, which are allowed to remain in it for twenty-four hours, and subsequently one day's drying in the sun is deemed quite sufficient. The smell of this preserved fish is abominable. It is their impression that good salt is too expensive for it to be profitable to them to use it in curing fish."

It is only just to those in authority to record that during the thirty years or more since the above extracts were written, considerable mitigations have been effected in the incidence of the salt-tax in India. The tax has been reduced, and in the case of supply to large fish-curing establishments has been removed altogether. It still, however, is maintained to an extent which is very greatly to be regretted. We may note that, during the period referred to, leprosy would appear to have diminished in most parts of India.

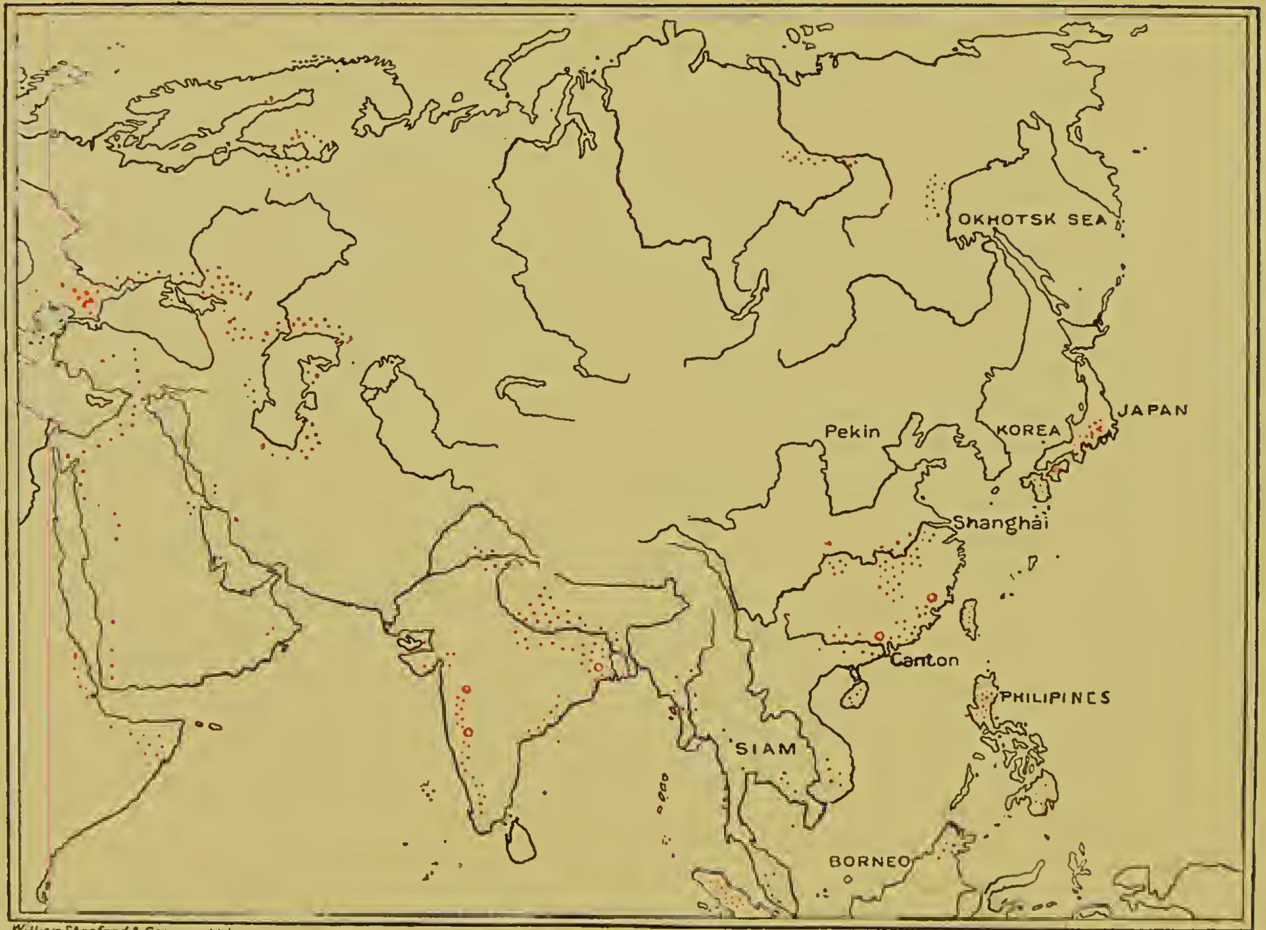
CHAPTER XXV.

NOTES FROM MY INDIAN TOUR.

The Commissioners for the investigation of leprosy who, under the Prince of Wales' committee in 1890, visited India, did not neglect to investigate the question of the connection of the disease with fish-eating. They were well acquainted with what had been alleged as to the fish-hypothesis, and they devoted much attention to its examination, viewing it, on the whole, favourably. They were disbelievers in contagion and also in hereditary transmission, and from first to last they suspected that the disease must in some way be dependent upon food. They felt themselves compelled, however, to report adversely to the fish-hypothesis, because they found that a not inconsiderable number of lepers in the asylums denied having ever eaten fish. A table, mentioning the asylums in which evidence had been collected, is given at page 315 of their report. They found not only that a certain number denied having ever eaten fish, but that the disease prevailed to some extent in districts where fish was likely to be a very rare article of food.

Having myself for many years, as the result of examination of the facts as to leprosy in various parts of the world, entertained a strong conviction that in some way or other fish-eating must be the cause of leprosy, I felt confident that further examination would show that the evidence which had been trusted as the basis of these negative conclusions was not unassailable. In particular it seemed not improbable that the statements made by patients had been received

PLATE VIII.



William Stanford & Company Ltd., Oxford

Map of Asia, Etc., showing the Distribution of Leprosy at the Present Time.
(o denotes a leper-home.)

[*To face page* 193.

with a too ready credence; and also that the supposed absence of fish in hill-districts might not be a fact. It might have been possible, I thought, that the investigation had been confined too exclusively to one kind of fish, and that mistakes might have occurred from forgetfulness to enquire especially as to dried and salted fish as well as to that which was eaten fresh.

In addition to these sources of fallacy as regards fish-eating, there has also accrued since the commissioner's report another very important suggestion—that, namely, as to the possibility of the communication from one person to another by food which a leper's hands had touched. It might be that almost all the cases in which fish-eating was denied were to be explained under the supposition that what has been called "commensal communication" had occurred.

It is to be noted that for the most part the denial of fish-eating recorded by the commission came from very few individuals in each asylum—one in many; two, three, five, seven or eight in others; whilst only in two instances was it considerable. My objects, then, in visiting India, were chiefly two: to take evidence afresh as to the denials by the lepers themselves; and, secondly, to enquire whether there were any districts in which leprosy occurred and where fish was practically unobtainable. I may own that I had a third object also before me, which was to explain to Indian observers of my own profession the aspects of the fish-hypothesis, which had I thought been much misunderstood, and to seek their co-operation in diffusing knowledge as to its bearing. With these aims I published not only in the medical press but in the leading newspapers of India a letter stating the opinions held, and asking for information respecting them. Application was also made to the principal medical colleges to be permitted to give a lecture upon leprosy within their walls, and to invite criticism and discussion. This was, in all instances, most courteously granted, and beginning with the Colombo college, large meetings were held at Madras, Calcutta, Lahore, and Bombay. In each instance the president of the college took the chair and invited discussion. In addition to these meetings I visited leper asylums at many places, and with the kind assistance of the medical officers attached to them collected a very considerable amount of information. My journey, which began in Ceylon and ended at Bombay, comprised the whole of the eastern part of India and the plain of the Ganges. I also visited Darjeeling, at the foot of the Himalayas, and several supposed leprosy centres in the Punjab.

It may be well here to repeat briefly that the fish-hypothesis is not at present prepared to suggest the precise mode by which fish becomes the cause of the disease, or to specify any particular kind of fish, other than that it is fish in a state of partial decomposition. It assumes that really fresh fish and really well-preserved fish are both alike innocuous, but that either cured or uncured fish in commencing decomposition may occasionally contain an ingredient which shall be effective in the causation of leprosy. Whether that ingredient be the bacillus itself or some toxine capable of stimulating and differentiating the tubercle bacillus already present in the patient's tissues, it does not profess to decide. It assumes that it is probable that even in fish in a state of decomposition the presence of the dangerous ingredient is exceedingly rare, but that a very small quantity of fish containing it may be efficient in the production of the disease. Thus the large or small consumption of fish has comparatively little to do with the matter. It is not the excessive use of fish, but the accidental reception of a specific ingredient in connection with it, which determines the occurrence of the disease.

In these respects leprosy ranges side by side to a

PLATE IX.

HOME FOR CHILDREN OF LEPROUS PARENTS AT ASONSOL (INDIA).

In connection with several of the Indian leper asylums refuges have been provided, into which the children born of leprous parents are received and kept under observation until they are considered safe from the risk of having inherited the disease. One such institution is here represented. They are for the most part supported by private benevolence, and are under the charge of devoted missionaries. Those visited by the author were in all respects well kept and comfortable.

It contained about twenty inmates, all of whom were supposed to be still free from disease. I found, however, one amongst them who showed unquestionable symptoms. "The Prince of Wales' Commission" when in India gave especial attention to these establishments with the view of determining whether the disease is often inherited. They arrived at a clear conclusion that it is not so, having found that a very large majority of the children remained permanently free. In the present instance, with the single exception referred to, all appeared to be in good health.

(From a photograph given to the author by the Rev. Mr Byers, the resident missionary in charge of the Asonsol leper home.)

[*To face page* 195.

considerable extent with tuberculosis. As the latter malady may be communicated by contaminated milk or meat received into the stomach, so, it is suggested, may contaminated fish produce leprosy. The risk of tuberculosis is not increased by the very free use of either milk or meat, or both, provided they are taken in a sound condition, nor does the smallness of the quantity taken give any security if the bacillus be present.

Under the head of "commensalism" are included all possibilities of reception of the bacillus into the stomach by the agency of contaminated food. Thus sweetmeats taken by children from the hands of lepers, meat or bread which had been touched by lepers, eating with the same spoon, are all possible modes of such communication. In these instances there is no question of a toxine: it is the bacillus itself which in all probability is received. In the Madras Hospital I saw two leper children, both about four years old, both in good health, but both showing unmistakable signs of leprosy. In each instance the child was born of a woman who was an inmate of the asylum, and had been suckled by its mother. Now a large mass of facts discredits the belief that leprosy can be transmitted by inheritance, and it is very unusual indeed for the children of leprous parents to show, as was the case in this instance, indications of the disease during early childhood. The leprosy bacillus has been detected in human milk, and by far the most plausible supposition appears to me to be that this was the mode in which it had been communicated in these instances. On the other hand it might have been taken from sores on the mother's limbs or nipple, for both the women were the subjects of the tubercular form of the disease.

At Lahore I saw a baker who, although a leper, was still following his occupation, and who came to the hospital because he had sores on the hands, which, he said, made it difficult for him to do his work.

Having made these explanations, I will now as briefly as possible examine the question as to whether there are any districts in India in which fish is not used as an article of food. Concerning the greater part of this vast territory there is no sort of dispute. Sir William Hunter, the distinguished author of the "Imperial Gazetteer of India," (as I must quote for a second time) has written:—"All the waters of India—the sea, the rivers, and the tanks—swarm with a great variety of fishes, which are caught in every conceivable way, and furnish a considerable proportion of the food of the poorer classes. They are eaten fresh, or as nearly fresh as may be; for the art of curing them is not generally practised, owing to the exigencies of the salt monopoly."

That these statements are literally correct I have every reason to believe.

Two districts were especially pointed out to me as being those to which the fish-hypothesis would not apply on account of the great difficulty of obtaining fish and the smallness of its supply. These were the Chota Nagpur district in Bengal, and the sub-Himalayan districts in the north of Hindustan. The former is a dry, elevated tract, at some distance from the sea, and having no rivers. Its leper asylum is at a little town named Purulia. Over and over again I was assured that if I went to Purulia I should find abundance of lepers who were resident in a district in which no fish was to be had. I went there, and in an asylum containing 500 lepers was assured that there was not one who had not habitually eaten fish, and that not a few attributed their disease to having done so, and had left off using it in consequence of that suspicion.

At Asonsol, an adjacent but much smaller asylum, I received precisely similar information. The sub-Himalayan districts, as representing which Darjeeling, Simla, and Kashmir may be mentioned, are hilly or almost mountainous tracts, which, on account of the distance from the sea and the absence of large tracts of water, have been erroneously supposed to be destitute of fish. I have it on the testimony of sportsmen who have travelled in these districts that fish is abundant in the mountain streams, and that it is caught and, to a certain extent, salted by the native population. On this matter the commission reported their surprise at finding at Darjeeling, 7,167 feet above sea-level, a plentiful supply of fish; and I may quote from the journal of Dr. Hooker, who travelled in Sikkim, a similar district, a statement which is very conclusive :—"On the Kalapance road, which we followed, we passed crowds of market people laden with dried fish in a half putrid state, which scented the air for many yards; they were chiefly carp caught and dried at the foot of the hills." After mentioning that some carried cinnamon, he adds: "The smell of the cinnamon loads was as fragrant as that of the fish was offensive." This was in September. I visited the fish-markets at Purulia and at Darjeeling, and can testify to the fact that fish in very varied conditions was abundantly obtainable in both. It is very easy in India to be greatly mistaken as to the water supply in any given district. If you go in winter you may find a dry sandy plain apparently most unlikely to afford fish, but which in the rainy season may present a very different aspect. I will not trouble my readers with further detail, but content myself by saying that I do not believe that there is any large district in India where fish is not obtainable, nor where it is not more or less extensively used as food. The places in which it is scarce, or only obtained at certain seasons, are, it may be remarked, precisely those in which there is danger of its being consumed in an unsuitable condition.

It would be exceedingly tedious were we to attempt to examine for the whole of India whether the prevalence of leprosy is in ratio with the probabilities of fish-eating. It has been frequently denied that any such relation can be traced, and in many districts a satisfactory conclusion from the very scanty data which we possess would be impossible. Roughly, however, it may be stated without fear of contradiction, that leprosy and fish-eating do go together, and that in the districts in which fish is scarce lepers are few. The cheapness or otherwise of salt is, however, a correlative in this matter. Many statements seem to make it probable that fifty years ago this connexion was more marked than it is at present. Means of communication have been developed and the supply of fish to inland districts has become practicable where formerly it was not so. This is possibly not a very important matter, and the chief fact to be borne in mind is, that in very large districts in India where fish is scarce, although lepers may be present they are in very small numbers. The general ratio for all India is not more than five in ten thousand, and in many of the districts referred to it does not amount to one in ten thousand. If we contrast that with the prevalence of the disease in the fishing island of Minicoy, or the fishing village of Kaligaun, where it reaches the proportion of one hundred and fifty per ten thousand, we shall be compelled to note the enormous difference. Certain other districts where fishing is largely carried on, as, for instance, the Malabar coast, the Konkan, and some parts of the coast near Madras and Calcutta, are also notable for the prevalence of leprosy.

No large district of the Indian Empire is reported as being quite free from leprosy. The proportion, however, is in some so small that it does not reach one in ten thousand of the population. In the Western Punjab it is only ·5; in Eastern Rajputana it is only ·7; in Scinde and British Beluchistan it is again only ·7; in the south central district of Madras it is ·8; and in the Central Punjab ·9. With the exception of the Madras district all these regions are in the north-west portion of the Indian Plain, and are thinly populated by native tribes. They comprise but few cities. A large region of Rajputana is occupied by the great Indian desert. The Indus river, with its five great northern tributaries, passes through the district on the north-west; but, speaking generally, the supply of fish is small, and opportunities for its importation very scanty.

Coimbatore and Salem, adjoining districts in what is known as Central Madras, may be taken as typical of the parts in that district in which leprosy is least prevalent. Coimbatore has an area of 7,432 square miles, and a total population of 1,763,274, consisting almost entirely of Hindoos. It is a flat, open country, 900 feet above the sea-level, and hemmed in by mountains. Cotton, tobacco and corn are its chief products, and more than half its area is under cultivation. It has no sea-coast, and is equi-distant from the east and the west.

Salem has an area of 7,653 square miles, and a population of 1,599,595. It is much more mountainous than its sister province. Its chief industry is weaving, and its chief crop rice. The Cauvery river, with its numerous tributaries, flows through it.

The districts of India in which the proportion of lepers per ten thousand of population is above one but below two are—Coorg in the far South; Madras Central, north-west of Coorg; Gujarat and Kathiawar in the Bombay Presidency; and the Southern Punjab. Gujarat, which may be allowed to include Kathiawar, is the northern seaboard of the Bombay Presidency, of which Konkan is the south. The total area is 41,000 square miles, and the population, exclusive of Kathiawar, nearly three millions.

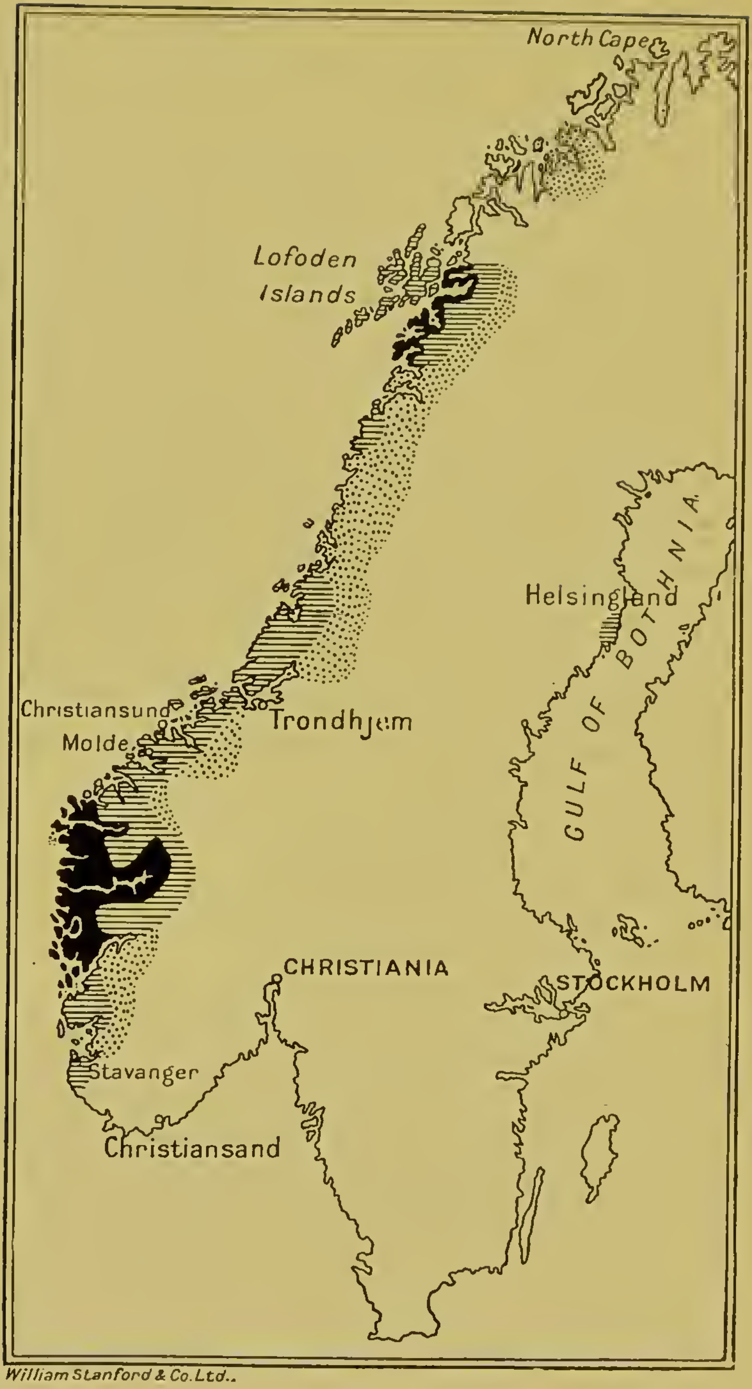
It is difficult to go into details respecting any peculiarities of these districts, and it would be tedious in the last degree if I were to attempt to conduct my readers over the rest of India in similar detail. The examples given must suffice, but I may again record that I returned from India with the conviction that no facts could be found there which are in opposition to the fish-hypothesis. If such there be it must rest with future investigators to state them. My experience has been that the rejection of hearsay evidence and careful investigation on the spot are all that is necessary. I have dealt in other chapters with the fallacies of much that is offered as evidence, and, in particular, with the worthlessness of the statements made by patients.

Leprosy investigation is always complicated, but it is especially so in India. We have to keep in mind as influencing local prevalence a dozen different agencies. Shrines and asylums collect lepers, and give an altogether artificial character to statistics. Famines reduce the number of lepers for the time being, but by causing many to break through their class prejudices as regards food they sow the seeds for a crop in the future. Cruel customs may drive the lepers from one district, and produce apparent excess in another. Religious creed may, in the same district, increase the liability of one sect and diminish that of another. Abundance or scarcity of salt may become of the utmost importance, and the same is the case with the development of roads and increase of trade. Lastly, we have the long periods of incubation which are possible in leprosy, which must be taken in conjunction with the fact that the Indian population is a mobile one, and that for various reasons those afflicted with leprosy are prone to travel.

Considerations such as the above being kept in view, it will be obvious that no hurried citation of Census-returns can help us much towards a truthful conclusion. The task must be undertaken with patient determination to allow their due weight to the very varied influences which are combined in producing the gross result.

For more detailed statements respecting Leprosy in India see Chapter XII. and Appendix.

PLATE X.



MAP SHOWING THE RESTRICTION OF LEPROSY IN SCANDINAVIA TO CERTAIN PARTS OF THE COAST OF NORWAY. (After Bidenkap.)

Explanation of Map.—The town of Bergen (which is not marked) is situate on the coast, about midway between Stavanger and Molde. The shading indicates the prevalence of leprosy. Where no shading is introduced, no cases whatever occur. Where the shading is light, there the proportion to population is small, and it increases with the depth of tint. Where small dots are introduced, sporadic cases are met with. At Helsingland, in the Bothnic Gulf, leprosy occurs in a small district, but it is not met with anywhere else on the Swedish coast.

[*To face page* 201.

CHAPTER XXVI.

LEPROSY IN NORWAY.

ICELAND AND THE FAROES.

It may seem almost superfluous to devote a chapter to the history of leprosy in Norway, since I have already referred repeatedly to the facts.* At the risk, I may admit, of some repetitions, it is, however, desirable to give to those facts very special attention. Norway is, indeed, in some sense, the battlefield of leprosy disputants, or at any rate it may compete with India for that designation. It was to the labours of two Norwegian physicians—Drs. Danielssen and Boeck—that we owe the first accurate description of the disease in its various forms, and the first real contributions to its pathology. Bergen hospitals have been visited by Virchow, Hebra, Neisser, Leloir, and many other European authorities in search after a practical familiarity with the phenomena of a malady which has claimed the interest of all nosologists. Nor have the successors of Dr. Danielssen been unworthy of their leader. It is to his son-in-law, Dr. Hansen, that we owe the discovery of the bacillus which plays so important a part in the evolution of leprosy. To the same physician, in conjunction with Dr. Looft, we must give credit for the best of our modern treatises on it, whilst the special topic of leprous affections of the Eye has been dealt with by Dr. Börthen, of Trondheim, with almost exhaustive fulness. In truth, the opportunities for these investigations which Norway has afforded have been unrivalled, and zeal and intelligence have been combined in their utilization. Having said this I am next, however, obliged to suggest that the lessons which Norwegian experience has during recent years been supposed to convey have been based on a fundamental error, and have led to mischievous and even cruel results. The error which I venture to impute is the assumption that because a bacillus is present, therefore the disease must be solely propagated by personal contact. This assumption has been allowed to outweigh all the evidence which careful observation had collected in proof of the contrary. That evidence, let us remember, had seemed conclusive to Drs. Danielssen and Boeck, who in the most explicit terms avowed their conviction that there were no facts in the history of leprosy in Norway which favoured the belief that it is contagious. No one pretends that these facts have assumed any new aspects, or that additional ones have been collected. The reasons for disbelieving in contagion remain exactly what they were when the authorities which I have named gave their verdict. It is solely obedience to a dictum which alleges that wherever there is a bacillus there must be direct contagion and that there can be nothing else, that the whole tenour of opinion in Norway has changed. Under this assumption a clamour for segregation, as the only remedy, has been raised, and it has been heard in the most remote parts of the world. Under its influence laws have been enacted which have consigned some thousands to lifelong incarceration.

---

* See pp. 42, 56, 64 and 73.

It may, however, be doubted whether the results just referred to would have been obtained had not the theory been supposed to receive support from the diminution of the disease in Norway itself. This diminution was assumed to be directly due to the passing by the Norwegian Parliament of a law in favour of isolation. I shall endeavour to discredit this deduction, and to show that probably the enactment referred to has had little or nothing to do with the diminution of leprosy. My argument will be that other explanations are much more probable, and that the law in question has in reality been inoperative.

In dealing with leprosy in Norway it is necessary to explain that only one particular district in Norway is involved. There is no more leprosy in Southern Norway and the inland district above Christiania than there is in Yorkshire. It is only on a strip of the western coast running north from Bergen, and to Trondheim and onwards that the disease is met with. When in the fifteenth and sixteenth centuries leprosy declined in Europe, although Denmark, Sweden, and Southern Norway shared in the general improvement this district did not. The explanation of this, to the believer in the fish-hypothesis, is easy, for whilst improvement in agriculture in other parts was supplying the population with other and better food, in this particular district such improvement was hardly possible. There is but very little land capable of cultivation, and the peasantry almost to a man combine with the occupation of farmer that of fisherman. Fish is their principal article of food, and we have it on good testimony that they prefer it when tainted.

In 1836 the first census of lepers was taken, and the number found was 659, all of whom, with the exception of three individuals, inhabited the western coast from Stavanger to Hammerfest. In 1845, during a general census of the people, the number of lepers was carefully ascertained, and no fewer than 1,122 were returned, of whom twelve resided out of the limits alluded to. The population of Norway at that time was 1,400,000. This gives a ratio of eight per ten thousand.

In 1853 another census was taken, which gave the number as 1,872. A writer about to be quoted states that this shows that the disease in seventeen years had increased by nearly 25·5 per cent. The length of coast affected, (Stavanger to Hammerfest), is about 800 miles.

The Lunggaard's Hospital was opened in 1849, and was designed for 80 patients, but never had that number. It was burnt in 1853, but was rebuilt. In 1854 a proposal to prohibit the marriage of lepers was brought forward in the Storthing and rejected by a small majority. At this period Drs. Hjort, Danielssen, and Boeck all strenuously denied contagion, whilst the two latter believed in hereditary transmission.

Dr. Hoegh published an account of the methods in which the lepers were enumerated in Norway in 1856. He stated that the 1853 enumeration was incomplete—it gave 1,647, whereas that of 1856 gave 2,000. He believed that in reality there had been a reduction of 74, and not an increase. He found the proportions of the sexes almost equal in the chief leprosy centres, but to the north of Romsdals the males were in excess, and especially so in Finmarken, where the total number of lepers was but small.

"The excess of male lepers over females was most marked in the upper Trondhjems district, where undoubtedly the highest degree of cultivation exists, and where the lot of the female is less hard than in any other part of Norway. To the south of Romsdals district we have an excess of females, and Hoegh believes that the proportion depends much on the amount of labour and privation undergone by the female sex in the various districts." (See *British and Foreign Medical Review*, 1858).

My suggestion would be that the amount of privation to which the Norwegian women were subjected would be a measure of their compulsion to eat badly-cured fish.

Dr. Danielssen writes concerning the fisheries : "I avail myself of this opportunity of referring more at length to the great sea fisheries which take place at certain seasons of the year, and this because the mode of life of those engaged in these labours has no little influence in the production of various maladies, and of leprosy in particular."

He describes the desolate character of the fishermen's habitations on islands almost uninhabited at other periods of the year; and having said that fish forms a large portion of the daily nourishment of the maritime population, adds, "Spedalskhed (leprosy) is essentially a disease of the sea-coast, and if it appears further inland it is to be observed along the course of rivers or on the borders of lakes. In our own country, the great localities for the disease are the deep fiords and islands which are found on our western coast, and which give to that coast its peculiar character. The larger of these islands are deeply intersected by the ocean forming inlets and bays, while the fiords run up for many miles inland, and form a number of secondary inlets, around which the population of our western coast, which is chiefly engaged in fishing, has located itself."

The writer of the able article in the *British and Foreign Medical Review* (April, 1858), adduced a great deal of evidence in favour of the belief that the influence of the fisheries had been great in spreading the malady. He thought that the disease had much increased recently, and that it was in some way connected with what he termed "the augmentation within the last thirty years of the fisheries on the western coast." He wrote of an Act which had then recently been proposed, forbidding the marriage of lepers as "a retrograde enactment unworthy of the present day," and added, "the proofs of the hereditary character of the disease are quite insufficient to justify such a restraint on the liberty of the subject"; and further, "that the project of compelling all the lepers of Norway to enter asylums built and maintained for that purpose, would be a still more direct infringing of the liberty of the subject, . . . by incarcerating a leper for life, and depriving him of all chance of entering into the marriage state."

Respecting the Faroe Islands Dr. Hjort writes: "We learn also from the Faroe Isles that the disease has there diminished, and is now almost unknown since the great sea fishings were relinquished and more attention was paid to agricultural pursuits" (p. 665).

In 1849 Dr. Schleisner, in his Medical Report on Iceland, after noticing the rapid decrease in leprosy there, continued: "I wish to call attention to the remarkable circumstance that upon the whole east and north coast—tracks of country in which no fishing is carried on—very few lepers indeed are to be found, while one-third of the whole island are to be met with in Guldbringe Syssen, and these principally in one parish where the principal fishing stations are situated."

It is matter of notoriety that the Norwegian peasant has no dislike to tainted fish. I have already quoted Dr. Danielssen's description of the manner in which a catch of herrings is consumed without any regard to stage of decomposition which may have been attained by the last part. It is also well established that during the last half century Norway has made great advances in social civilization; tourists have flocked to its fiords and valleys, and have taken with them wealth and a higher conception of comfort and better taste in food. Emigration has also prevented over-population. The methods of curing fish have also been improved. Keeping these facts in mind, and remembering also that both in Norway and in Iceland, as we have just seen, it is the fishing districts which are the haunts of leprosy, and that in the Faröes the disease, formerly prevalent, has wholly vanished subsequent to the abandonment of the deep sea fishing; let us now turn to the question as to what may be reasonably believed as to the recent diminution of the disease in Norway. I will not trouble my readers with many statistics; they are to be found by those who attach importance to them fully stated in Hansen & Looft's excellent little handbook. I am concerned rather with the general aspect of the facts, and will content myself by saying there has been, during recent years, a large and progressive reduction in the number of registered lepers. The question is, has there been any real connection between isolation-measures and what has followed, or have the results been due to other agencies?

Inasmuch as my contention must be quite definite that such measures of segregation as have been attempted in Norway could not possibly have produced the results with which they are credited, it follows that I have but little interest in the examination of the minutiæ of so-called statistics. Were those statistics far stronger than they appear to be I should still allege that they were quite inadequate for the purpose to which it is attempted to apply them. The fact is that there has been no real segregation of lepers in Norway. In the Sandwich Islands and in Cape Colony segregation laws have been ruthlessly enforced, and with wholly negative results; but nothing of the kind has ever been attempted in Norway. The diminution in prevalence of the disease began in 1856 and continued steadily, at the rate of a hundred a year, during the next fifteen years. During that period not a sixth of the lepers were in asylums, and five-sixths were at their own homes and were being assured on medical authority that their malady was not a contagious one. No precautions were being taken, and it is clear that some other cause must be sought for the diminution of the disease. In 1870 Dr. Hansen, having discovered the bacillus, began to urge the doctrine of contagion, and in 1875 he procured the enactment of a law which many subsequent writers have assumed to be efficiently stamping out leprosy. For practical purposes, however, I believe it might be said that the law never came into operation. Its adoption was subject to local option. No new asylums were built, and the number of those segregated declined rather than otherwise. As the disease was already, as I have just shewn, under other influences already undergoing reduction, the ratio between those at their own homes and those in asylums became altered, but up to the present day it is the fact that more than half are at their homes. No compulsion has been exercised, and all that has been effected for those remaining with their friends is to advise that those affected should neither sleep in the same bed nor eat at the same table with the healthy. That such precautions might prevent a few cases of commensal communication is to be admitted, but that they are adequate to prevent the spread of an insidiously contagious disease, may at the same time be denied. These considerations are urged rather for those who, in Cape Colony and elsewhere, believe that the measures they have adopted have the sanction of Dr. Hansen's authority, rather than for Dr. Hansen himself. Several expressions in his recent writings would lead to a suspicion that he entertains, after all, but a very limited belief in the importance of contagion and of expedients for its prevention. In his latest paper, in discussing the arrangements for lepers travelling to asylums in public conveyances, he writes: "We have no particular rules for the transport of patients, and *see no reason for them.*" Further, he makes the avowal that, "Leprosy is a disease which it is not necessary to have any particular dread of;" and yet further, apparently abandoning the idea that contagion is in itself efficient, "In order to stimulate it into action there are evidently required special circumstances which we unfortunately know nothing of." Thus then, my much honoured friend and myself, commencing as disputants, come at last to the same conclusions. We both hold "the special circumstances" which stimulate the bacillus of leprosy into action are the all important factors in the causation of the malady. My friend thinks, however, that we know nothing as to what those circumstances are. I, on the other hand, hold that an acquaintance with the facts as to leprosy in other parts of the world points definitely to one conclusion, and with great confidence I challenge Dr. Hansen to show that the fish-hypothesis is not also abundantly applicable to his native land.

Almost the whole of the salt used for fish-curing in Norway is, I believe, imported. All admit that the quality of this salt has of late years been much improved. I am not, however, inclined to attribute the progressive diminution of leprosy amongst the Norwegian peasantry solely to this cause. It has more probably resulted from improved social conditions which have changed the dietary and substituted better articles of daily food for those formerly in use. The consumption of rotten fish, to which fifty years ago Dr. Danielssen bore such striking testimony,* has no doubt been much restricted, and with that restriction, and quite independently of any laws which may have found a place in the statute book, the diminution of leprosy has resulted.

---

* Dr. Danielssen wrote: "Herrings are generally used in a salted state; rarely, if ever, are they eaten fresh. But the greater part of these salted herrings are exceedingly ill prepared for the table." After stating that the fish are often left, in default of buyers, on the shore, he adds: "After the lapse of some weeks these herrings are, in a manner, pickled—that is to say, they are sour (half rotten), and then they become the daily food of the whole family. Each week until they are consumed they become more and more decayed, but nevertheless the nauseous food is eaten till not a herring is left. Nay, so constant is this hateful custom among the peasantry, that they will not touch fresh fish, but prefer to leave it for some days, until incipient decay gives it a zest for their coarse palates."

CHAPTER XXVII.

LEPROSY IN CHINA.

THE facts as regards leprosy in China and amongst the Chinese are of the utmost importance. The disease has probably existed in China from very remote times. In some parts of China it is very prevalent, and all observers agree that the Chinese as a race take leprosy with them wherever they go to reside. In Australia, California, the Sandwich Islands, and many other places, immigrant Chinese have introduced a disease which is so obviously connected with their race that it has often been named after them. In not a few regions of the world leprosy is known as "the Chinese disease."* Yet in China itself we encounter the very noteworthy fact that whilst the disease abounds in the south there are large districts in the north where it is unknown.† Surely we have here a fact which, rightly interpreted, ought to give us light as to the cause of the malady. The race is the same and its habits are the same,* there is free intercourse, and yet from generation to generation certain parts suffer and others escape. That the explanation cannot be given by reference to geological formation or climate is made clear if we remember that in all parts of the world where Chinamen go they take leprosy, and, so far from getting rid of it themselves, often appear to be the means of its spreading amongst their hosts. This has occurred with especial emphasis in the case of the Sandwich Islands.

---

* "No impartial student of the question can fail to see that in the Pacific and the East Indian islands leprosy has dogged the footsteps of the Chinese coolie. . . . The dread disease is independent of temperature and vegetation; but in the Far East it is dependent upon the Chinaman."—Cantlie's Prize Essay, p. 270.

† "The climate in this porous northern district is in marked contrast to that of the south. Its summers are hot and dry, so that one's skin cracks and peels unless it is oiled."—Cantlie, p. 270.

Pekin is described as "wholly without advantages of position, being situated on a barren and sandy plain." It has a cold winter, with snow and thick ice.

Pekin is in the extreme north of China and Canton in the extreme south. At Pekin leprosy is unknown, and at Canton it is very common. What can be the cause of the difference? At both places the Chinaman is a careless feeder, eating without scruple everything that he can get, and very dirty in his general habits. Further north than Pekin—Japan, Siberia, etc.—leprosy is again prevalent, so that it is clear that the colder and more bracing climate is not to be cited as explanation.

In most of the older reports as to leprosy in China we have little more than the statement that the disease is common in the south and rare in the north. It is to the able prize essay of Mr. James Cantlie that we are indebted for more precise information, and it is from that essay that I chiefly take the facts which I shall now proceed to cite.

Mr. Cantlie quotes from a report prepared for him by Mr. Sydney Skertchley as follows: "The great alluvial plains of the Si-kiang, with the vast population of Canton, and the hills and mountains, are alike the seat of leprosy in Kwantung and Fokien, and nowhere is it more rife. It occurs again, but in greatly diminished force, in the central plain of the Yangtse, but is absent from the equally great and as densely populated Yangtse plain of the east.

---

* A recent geographer speaks of the 400,000,000 inhabitants of China proper as "forming generally a homogeneous people, with one type of countenance, one written language, similar modes of thought, and great uniformity of dress, habitation, and social life."

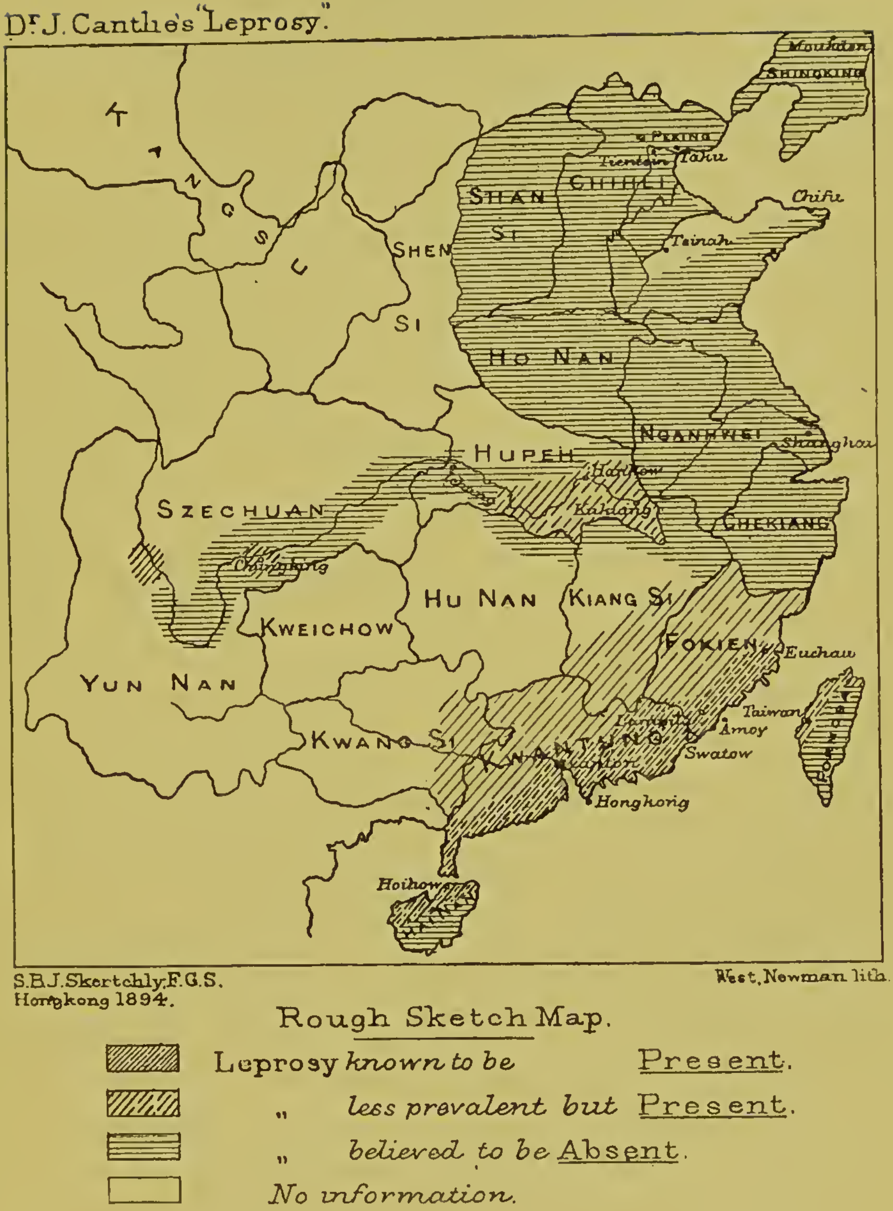
Neither mountain nor plain affects it. The forest region of Cochin nurtures it, the forest region of Szechuen does not. The swampy rice fields of Kwantung are a hotbed of it, the swampy rice fields of other places are not. Of this we may be certain, that Kwantung and Fokien, and the vicinity of their coasts especially, are the chief centres of leprosy in all the great empire of China. Yet it is not the sea which is the determining cause of leprosy, for long stretches of the coast even in China are untainted. Climate again offers no solution of the question. It may confidently be affirmed that leprosy is not dependent upon nor even influenced by climate in any portion of the area dealt with in this report."

Mr. Cantlie himself fully accepts the verdict of his friend on the question of climate. This step being gained, it would appear that we have, as almost the only possible explanations, contagion or food. In reference to contagion it might almost seem enough that no precautions are now taken in most parts, and that the disease is very sparingly prevalent over very large areas. It is, as I have repeatedly pointed out, impossible that an actively contagious disease should continue year after year only sparingly scattered over a large, densely populated area. Some items in reference to this matter may perhaps add to the impressiveness of the general statement.

Referring to Chihli (Pekin), Mr. Cantlie writes: "A stray case or two have appeared. In 1887, one turned up at the Medical Clinic, hailing from Chefu. The leper had travelled from that city across the Gulf of Chihli, to seek relief in Tientsin. Another in 1888 came from the same district—the great plain of Shantung. Such cases, however, do not make Chihli an infected province; indeed they point to the fact that the natives are not prone to the contagion. Chihli may be said to be as free from leprosy as the county of Middlesex."

Most heartily do I agree with Mr. Cantlie in his remark

PLATE XI.



FACSIMILE OF SKETCH MAP ILLUSTRATING THE DISTRIBUTION OF LEPROSY IN CHINA, GIVEN IN MR. CANTLIE'S PRIZE ESSAY. (The reader must carefully note the explanation of the markings, for unlike some other of the maps depth of shading does not denote prevalence.)

[*To face page* 212.

that vagrant lepers, moving about without precaution and turning up from time to time amongst hospital out-patients, "point to the fact that the natives are not prone to contagion." But the question remains, Why are they not prone? To this my answer is that the disease is not contagious, but is due to eating bad fish, and that these insusceptible natives do not eat bad fish.

In Manchuria the same lesson is repeated. Dr. Christie, who had resided there, told Mr. Cantlie that "endemic leprosy seemed to be unknown in Manchuria—the few cases seen were Chinese from the south canton." Thus the opportunities for contagion occur, but there is no spreading. Very similar evidence is given by Mr. Cantlie respecting the Samoa Islands. It is believed that leprosy has never been indigenous there. Two Chinese lepers and one Sandwich Islander have resided there for long, but the disease has never spread. The natives live on the sea border and eat fresh fish.

In the I. M. G. for September, 1890, in his report on the health of Chefoo, Dr. W. A. Henderson writes: "In this part of China leprosy is very common, especially those forms of it evidenced clinically by affections of the nervous system. There is also a fair proportion of the tubercular and ulcerating varieties. As far as my experience of leprosy in China goes, I have failed to obtain any positive evidence of its contagiousness, or to throw any light on the great problem of its propagation. Although it is very prevalent, and I see cases of it every day, I have never yet been able to trace the source in any case to the fountain-head. A common answer of a patient is that none of his family have, or ever have had, a like disease. Often they do not know of another case in their village, etc. . . . Certainly, if it be contagious, it is but in slight degree and in a special way."

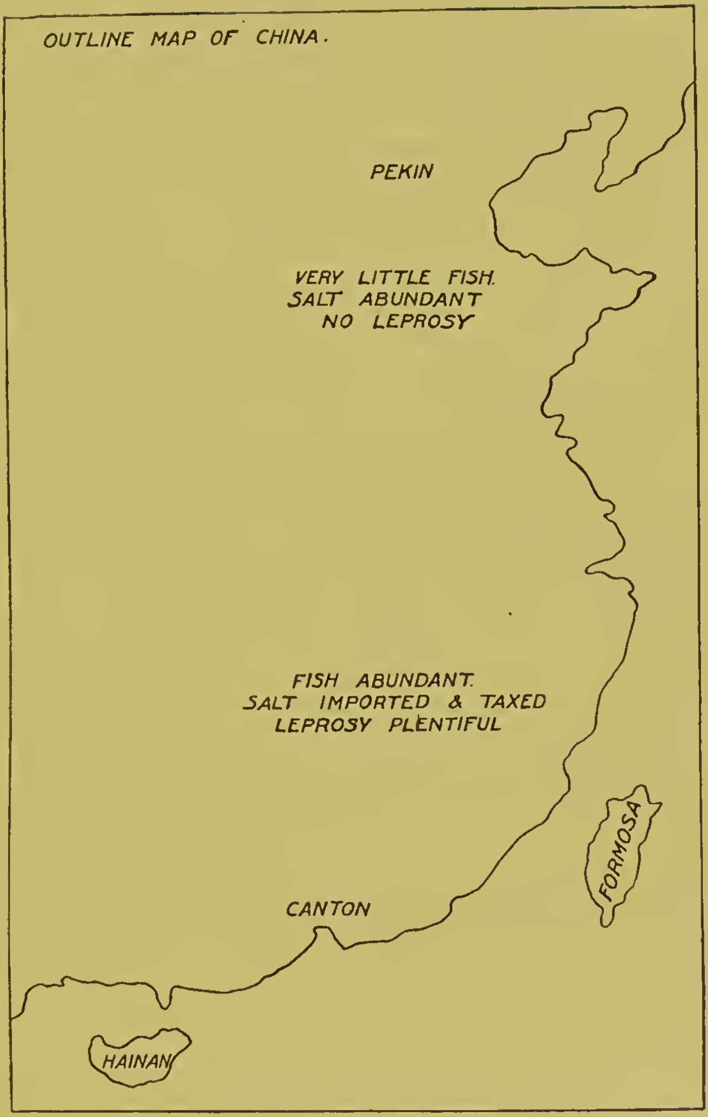
We come then to the definite question as to whether any difference in dietetic habits exists between the inhabitants of Northern and Southern China. That fish of all qualities is largely consumed in the south every one admits. The Chinaman is a fish-eater, all the world over, if he can get it. Can he get it in the northern provinces of his native land? These provinces exist at the present time under very peculiar conditions. South of Pekin for seven hundred miles there extends an alluvial delta which is in process of conversion into a desert. Quoting again from Mr. Cantlie, "The drying up of the north is inevitable; it is the direct result of the geological growth of the continent." "The traveller in North China, going west is vividly impressed with this desiccation. He sees it in dying streams, in dry watercourses, in dwindling or deserted towns; and already the desert seems to be knocking at the western gates of Pekin."

Respecting the district referred to, I find in the "Encyclopædia Britannica," in the description of the province of Shanse (near Pekin, to the south-west), the statement, "Meat is a rare luxury, *and salt fish, the usual substitute for meat, is consumed only by the wealthier classes*." Add to this that it is a region in which salt mines are largely worked, and it becomes a fair inference that the fish is well cured. The roads in China are bad, and in districts not close to rivers the transference of articles of food from place to place is very little. The Chinaman lives on what he produces himself, and if his home is in "a desiccated country" at a distance from sea and river he must do without fish.*

---

* In Mr. J. F. Davis' "Description of the Empire of China," we have the following (Vol. I., p. 315): "The consumption of salted provisions is very general, and enables the Government to draw a large revenue from the "Gabelle," which it levies on salt. In consequence of the immense quantities of both sea and river fish which are daily caught, and the rapidly putrescent nature of that species of provision, a considerable portion is cured with salt and dried in the sun, the *haut gout* which generally accompanies it being rather a recommendation to the

PLATE XII.



THIS MAP, WHICH IS REPEATED AT PAGE 357, IS GIVEN HERE AS COMPANION TO MR. CANTLIE'S, WHICH IT ILLUSTRATES WITH PERHAPS ADDITIONAL CLEARNESS.

[*To face page* 214.

It is very possible that leprosy has disappeared from the provinces adjacent to Pekin within recent times. Authorities of fifty years ago spoke only of its being less prevalent in the north than the south, and it is by Dr. Liveing, writing in 1875, that we are told for the first time that it is almost entirely absent. Some of the details as to its present distribution are not without their lesson. In the great city of Pekin, with its population of two millions, and which with its hospital and other charitable attractions, represents of course a very large surrounding district and brings together various allied races, it is believed to be quite unknown (Dr. Dudgeon and others). In Tientsin, the Liverpool of Northern China, there is a hospital and the only medical school in the empire, but with the rarest exceptions no lepers appear (see *ante*, page 212). In the whole district of Chihli and the adjacent one of Peh Chihli, the disease is, according to some authorities, unknown. Probably there are a few cases.

In Chian Su, the maritime province in which the port of Shanghai is situated, leprosy is reported not quite absent, but "the rarest of rarities" (Dr. R. A. Jamieson, quoted by Cantlie).*

In the very fertile and densely populated maritime province of Chekiang leprosy appears to be almost extinct.

---

taste of the Chinese. Indeed, it is one of their most favourite as well as universal articles of food, and they even overcame their prejudices or indifference for whatever is foreign on the occasion of salted cod being introduced for two or three years in English ships; the somewhat decayed condition in which it reached China being said to have been anything but a drawback."

* *Shanghai.*—Dr. Henderson, the medical officer of the Chinese Hospital, reported to the College of Physicians in 1867, that leprosy was common in the district around Shanghai, and not more common on the sea-coast than inland. He stated that there can be little doubt that bad, insufficient, and ill-prepared food is the cause of leprosy. He did not think it hereditary, and had not met with a case in which it appeared

It may be supposed to be well supplied with salt but further enquiry as to details is desirable.

In China as in other countries most leprosy-observers have omitted to record much detail as to food. Inasmuch as the suggestion as to fish is not that quantity is dangerous, but that its specific cause is in connection with certain states of decomposition which are but rarely met with, it cannot cause wonder that the popular suspicion as to fish diet should be by no means universal. Yet this suspicion is mentioned repeatedly by Mr. Cantlie as being entertained at various places in the south. Mr. Hodge, reporting of Hankow in the inland province of Hupeh on the banks of the Yangtse, says, "Some associate leprosy with eating bad fish, others blame the eating of reptiles."*

Dr. Finch, of Lui-fu, Szechuen, reports, "Leprosy very rare. Fresh fish is not obtainable and salt fish is used very sparingly."

It is needful to correct a misstatement which found its way into one of the prize essays published by the "Prince of Wales' Committee." In an excellent essay on the "Decline of Leprosy in Great Britain," a quotation from Doolittle "On social life in China" was given, which described in much detail two leper homes in Tientsin. Now Tientsin is in the north of China and in a district

---

to be contagious. No precautions were taken, and notwithstanding a recent period of much poverty, he held that the disease was not on the increase. He had seen the disease in Canton, and wrote that the outward forms or manifestations of leprosy in Canton are very different from what they are in Shanghai.

* Dr. R. A. Jamieson, writing in 1875, recorded that "Dr. Liveing, in the Gulstonian Lectures for 1873, states that leprosy is not found in China north of the Yangtze-kiang. This may be so as regards some of the provinces through which the river flows, but it does not hold good in Hupeh, for the disease extends along the banks of the Hau in a northward direction.

supposed to be free from leprosy. Mr. Cantlie, in another prize essay, drew attention to this discrepancy, and after fresh inquiry reasserted his belief that neither lepers nor leper-homes were to be found in Tientsin. On further examination of Doolittle's work it was seen that his statements really concerned Fuhchow and not Tientsin. The mistake had occurred from the fact that Tientsin was the last place mentioned in the text prior to the statement, "In this city," which preceded the description of the leper homes. The table of contents, however, makes it quite clear that this expression referred to Fuhchow, and we have another instructive warning as to the possibility of erroneous statements finding their way into print even under the auspices of careful writers. Fuhchow, it is needless to say, is in the south of China, in a province which abounds in leprosy.

I may confess that when I first realised the fact that leprosy is unknown in the north of China, and that the districts from which it is absent abound in salt and have very little fish, I thought that it brought the question to an end. Nor has subsequent investigation much modified that impression. I can see no escape from the inference that the two facts are in connection as cause and effect. In order to avoid fallacies, I inserted in the pages of the *Lancet* a short letter, asking those more conversant than myself with the social and dietetic habits of the Chinese whether any other explanations could be suggested. This letter has gained me no information. So far as is known the food of the residents in the north is the same as that of the south, with the single exception of the abundance of salt and the deficiency of fish. Thus we are enabled to put aside the suggestion of pork, decayed vegetables, and other articles of which it has been said that they may possibly be causes of leprosy.

CHAPTER XXVIII.

LEPROSY IN COLOMBIA.

The Republic of Colombia comprises the Isthmus of Panama and a large adjacent territory in the north-west corner of South America. It has a coast line on the Pacific to the west, and the Gulf of Mexico on the north. The population is from four to six millions, the language Spanish, and the religion Roman Catholic. There are 220,000 unmodernised Indians. The high lands are healthy, but the swampy parts are malarious.

Colombia is supposed to be the most ancient seat of leprosy in America, and some claim that Carthagena and others Bogota was the place in which the first case occurred.

Ricardo Parra, a Colombian physician, was himself a leper, and wrote an account of the disease, which is quoted by Dr. Albert Ashmead (*see* Leprosy Pamphlets, IV.).

Tradition states that there was no leprosy in the country prior to the Spanish occupation, and that the first to suffer from it was a priest in the Cathedral of Bogota, who died of it in 1646. There was, however, a yet earlier tradition which asserted that Ximenes de Quesava, who founded the city of Bogota, himself died of leprosy there in 1579. It will be seen that both traditions give a Roman Catholic Spaniard as its first victim. It would appear that during the following two or three centuries the disease slowly but surely extended. Bogota, the capital, is inland, on a mountain plateau. Of late years the prevalence of the disease has occasioned great anxiety, and leper asylums have been established, and regulations more or less stringent have been enforced. At the present time the disease is still so common that the Government has recently endeavoured to induce Dr. Hansen to go over and give his advice.

A leper village, Contratacion, has been for forty years in existence, under Government control, at Agna de Dios, two-and-a-half days' journey from Bogota. It is 1,400 feet above sea level, on a dry sandy soil, and having a temperature of from 82 to 85 degrees. This place was chosen as the site for a lazaretto because it had long enjoyed a reputation for the cure of the disease. There from five to six hundred lepers now reside. They constitute about a third of the population (of the town), and we have it on the testimony of Mr. Wheeler* that although all the houses stand in their own gardens, there is no avoidance of the lepers by the healthy, there being no leper-quarter, and all associating together on terms of intimacy. Mr. Wheeler adds that there is no record of any case having originated from contagion, and that no leper husband or wife has ever contracted it from the other. The repute of this location as being beneficial in leprosy attaches itself to certain mineral springs. Mr. Edward H. Hicks, an able surgeon who practised in Bogota and gave much attention to leprosy, bears testimony to the fact that "Here the unfortunate victims undoubtedly obtain some relief from their sufferings, and in some cases improve sufficiently to be able to earn their own living, though no systematic course of treatment is adopted at that establishment."

Mr. Hicks, who was a believer in contagion, gives us the following statements:—

"The disease occurs chiefly in places having a temperature of 73° to 64°; damp and low-lying districts being especially favourable for the development of the disease, whilst places having a temperature of 80° and upwards seem to have some influence in mitigating it." "As to articles of diet, the greater number of cases occur where fish cannot be obtained." "The race most frequently attacked are the whites, next the mixed Indians and whites, next the pure Indian, and finally the African negro race, which seems to be the least frequently attacked."

---

* The late Mr. Thomas H. Wheeler was *Chargé-d'Affaires* at Bogota, and worked at the subject of leprosy in conjunction with Mr. Hicks.

Mr. Hicks adds, "In favour of the contagious nature of the disease there is the strongest evidence. In districts in which the disease was formerly unknown it has appeared and spread with great rapidity, the first cases occurring shortly after the return of former inhabitants of the district who had contracted the disease in a distant province. But contagion seems only to have occurred where the leprous and the healthy lived together on terms of great intimacy, eating and drinking out of the same vessels, and wearing the same clothes."

The following is quoted from a paper by Dr. Albert Ashmead.

"In Colombia, South America, where river fish and bananas serve as principal food for the multitude, because they are so easily procured that no man need work for a living, in forty years, as U. S. Minister McKinney wrote me, leprosy has spread from 400 to 30,000 cases."

The editor of the *Medical Review* of Bogota some years ago estimated that one-tenth of the inhabitants of the departments of Santanda and Boyaca were affected with leprosy, and as these departments have a population of one million, this estimate implies 100,000 lepers. A physician, however, in charge of the Lazaretto, who investigated the matter more carefully, believed that there were not more than 30,000. The facts as regards the recent increase of the disease here are closely parallel with those of Cape Colony, with the difference that the disease seems to have been much more severe. It has advanced, *pari passu*, with the increase of means of transit. It is to be remembered that the inhabitants are chiefly Roman Catholics, and would therefore be likely to welcome the supply of fish when made possible by roads.

The following extract from a sermon preached by the Rev. Father Rabagliati on behalf of lepers in Bogota, will show his estimate of the conditions. He estimated the number in the Republic of Colombia as at the least 15,000.

"During fifteen years which I passed in the Argentine Republic, in Uruguay and in Chili, I did not see one leper. If any one should take the time and patience to gather precise data on this subject, 'Leprosy in the World,' the result would be, that the Republic of Colombia alone has more people attacked by leprosy in its different manifestations than all the other nations of the universe. Really such a thing is amazing and terrible."

It is of interest to note that the Rev. Father, although so deeply impressed with the prevalence of the malady, did not quote such formidable statistics as some of his predecessors. He estimated the total number at 15,000, which, in a total population of four millions, works out at a little more than 37 per 10,000. This is a very heavy ratio, seeing that it applies to the whole country, large parts of which are almost free. The ratio for India is only 5 or 6 per 10,000.

In order that I may give a fair representation of the opinions of others as well as my own, I quote the following sentences from a leading medical journal:—

> The number of lepers in Colombia is said to have risen within a century from 97 to at least 30,000, and whereas the disease was then confined to three or four departments, all are now more or less infected. Its increase is ascribed to the abandonment of all measures for the segregation of the lepers, and to the unrestricted intercourse between them and the healthy members of the population. The leper village of

Contratacion, founded in 1862, was at first avoided by the other inhabitants, and all possible precautions were taken for the disinfection of money paid by them in exchange for the articles they needed. The village, which then had but 27 lepers, now—according to a statement quoted in the *Tablet*—contains a diseased population of close upon 1,000, and its weekly market is crowded by the inhabitants of the neighbouring healthy districts, who buy and sell there without restriction. The lepers intermarry, not only amongst themselves but with the healthy, and experience no difficulty in finding wives outside their own community. Although there is rarely offspring of a union between two lepers, this is not the case when one parent is free from the disease. The children of these marriages, even if themselves healthy, have to pass their lives in the tainted atmosphere of the leper village. By the present regulations, according to which a healthy woman marrying a leper receives the same allowance for maintenance from the State as the diseased, these mixed marriages are encouraged, with the result that the taint is transmitted to the next generation. It is to be hoped that the statements which we have quoted are exaggerated.

The suggestion as regards places where leprosy has increased, that such increase has been due to neglect of segregation is very frequently made. The present may be a suitable place to again confute it. I have quoted evidence showing that although in the town in which the segregation homes are situated only one-third of the population is diseased and the utmost freedom of intercourse prevails, yet there has never been any reason to suspect contagion. So far from the Home being a source of danger to the community, it is held that the district is favourable to recovery, and lepers go to reside there not so much with a view to isolation as for their own benefit. If the malady were contagious it ought to spread in the neighbourhood of the Home—but this has not been the case; it has increased all over other parts of the country and not at all near the Home, where the conditions conducive to contagion would appear to be concentrated. It must also be remembered that in numberless other places the disease has died out or greatly diminished, notwithstanding the absolute neglect of all precautions. This was the case in England and Mid-Europe in the Middle Ages, when, as the disease declined, the very imperfect attempts at segregation which had prevailed were wholly laid aside, and the leper homes were occupied by others, the blind and otherwise disabled, as well as lepers. Had the inhabitants of Colombia been impressed with the efficacy of such measures as had been in force in former times, they would surely have had recourse to them again when half a century ago the disease began its alarming increase. On the contrary it is in evidence that they did not fear contagion, and it was left for the Government, guided by professional opinions, to attempt to enforce segregation. The time which has elapsed since the asylum was organised has now been sufficient to permit of a quite negative verdict being recorded as to its efficacy. The disease has continued to prevail and possibly to increase, and the Government is at the present moment at its wits' end as to what should be done. It must therefore, I would suggest, be evident that there is some unsuspected cause for its increase quite other than personal contagion.

As regards what the character of the increase has been, it must be noted that the estimate of only ninety-seven in the beginning of the century is probably a mere guess, and the present number is known with so little of exactitude that whilst one observer quoted 30,000, and another 15,000, yet a third (see *The Satellite*, June, 1892) averred his belief that there were not then more than 300.

In reference to the suggestion which I have made that the increase is due to the development of communication by road and the diffusion of salt-fish from the coast amongst an inland fast-observing population, we again find some discrepancy of statement. Mr. Hicks' statement that the disease occurs where no fish is obtainable may, I believe, be regarded as applying only to fresh fish. A gentleman who, under the signature of "Colonist," wrote a letter to *The Times* newspaper discrediting the fish-hypothesis, was answered a day or two later by the following :—

> [*The Times*, Tuesday, September 15th, 1903.]
>
> ROMAN CATHOLICISM AND LEPROSY.
>
> *To the Editor of "The Times."*
>
> Sir,—Your correspondent "Colonist" evidently has never been in South America, or he would know that considerably more than 90 per cent. of the fish eaten on Fridays and other fast days is dried codfish, which often can be smelt many yards distant.
>
> He says "there are millions of Irish Catholics who eat fish regularly." Quite so ; but it is wholesome, and generally fresh, fish, and not such as described above. Also, thousands on these islands almost live on good, sound fish, and there is no leprosy among them.
>
> For years thinking men in South America have attributed the awful disease to bad, and in some cases rotten, salt codfish. If "Colonist" had seen the squalid encampments of lepers, as it has been my lot too often to see, he would not attempt to stop a discussion which may help us to find out the cause of, and the remedy for, the loathsome disease.
>
> Your obedient servant,
> WALTER J. HAMMOND,
> For 20 years resident in S. America.

I am not sure that Mr. Hammond's statements refer especially to Colombia, but from a very intelligent merchant, who had lived long in Bogota itself, I had the most definite assurance that much salt-fish is eaten there, and that it is often in very bad condition. He assured me that if badly cured fish could cause leprosy, what had occurred in Colombia was well explained. He had seen many lepers.

To sum up, we may, I think, state the case as follows :—

Leprosy was not indigenous to Colombia. It was introduced by the Spaniards, and its first victims were Roman Catholic priests. It has persisted ever since the Spanish conquest to an extent which it is impossible to estimate accurately. It has during the last half century much increased. Salt fish is freely carried inland and reaches the capital often in bad condition. The population is Roman Catholic and therefore likely to desire fish for the fast days. The experience of the leper village does not afford any support to the belief in contagion. Forty years of attempts at segregation have done nothing to check the increase of the disease. During the last three centuries there have been abundant opportunities for spreading by contagion, but it has only been coincidently with developed commerce (steamer on the Magdalena, railroads, &c.), and increased facilities for obtaining salt-fish inland that there has been any marked increase of the disease.

I come then very clearly to the conclusion that the influence chiefly at work in causing the prevalence of leprosy in Colombia is the encouragement given by Roman Catholicism to the importation of salt-fish. In conformity with this is the evidence given by Mr. Hicks that the whites, contrary to experience in most other countries, suffer more than others. It is they who are most likely to observe fast-days, and who would be best able to afford salted fish.

The real remedy for leprosy in Colombia is not the formation of lazarettos, but the enactment of a law forbidding the importation of salt-cod. The quantity which reaches the high uplands where Bogota is situated is trifling in amount, though the article is often very bad in quality. The reason that Agna de Dios has obtained a reputation for the cure of leprosy is, probably, that it is in a district where not even the smallest quantity of this article is to be had.

[P.S.—I owe my best thanks to Dr. E. H. Hicks (now of Wymeswold) for much valuable information which I have used in the compilation of this chapter.

For some additional items of information respecting Colombia see Appendix.]

CHAPTER XXIX.

THE SANDWICH ISLANDS.

The history of leprosy in Honolulu and the adjacent islands might well occupy a whole book instead of a short chapter. What has been already published about it might fill a library shelf. In these islands, in the middle of the century which has just closed, there occurred the most remarkable outbreak of the disease of which we have any record, and here in the fruitless endeavour to suppress it by segregation, measures have been tried on a scale and with a consistency never equalled elsewhere. In Molokai Father Damien lived and died, having devoted his life to the endeavour to bring spiritual comfort to the hearts of lepers. Nor have the impulses of secular benevolence and scientific zeal been in any degree behindhand. Dr. Arning lived three years in the islands in order to study the disease, and he and many other medical men have freely exposed themselves to risks similar to those encountered by the much honoured and well deserving priest.

Some of the facts respecting the outbreak have been the subjects of rather heated controversy. The believers in contagion have been very desirous to assert that the Chinese were the introducers of the disease, and that it was not known in the islands before their advent; whilst others have alleged that there is clear evidence that it had been present from distant times. It is agreed, however, that the very remarkable prevalence which brought about the institution of a segregation-home and the enactment of compulsory laws was new, and that in some way, which it is of the utmost importance to investigate, the Chinese coolies, who had immigrated, were its cause.

The principal facts as regards these islands are as follows : They were discovered by the Portuguese in the middle of the sixteenth century, but no settlement then took place. They were visited by Captain Cook in 1778, and were then inhabited by people supposed to be of the Malay race,* who were thriving and of friendly disposition. They were industrious, accustomed to the cultivation of taro in irrigated fields, much addicted to fishing, and possessing artificial fish-ponds. They were in the habit of eating their fish raw, and it is considered certain that they did not cure it by salting. Whether or not they dried fish is doubtful, but we may accept it as highly probable that nearly all of their fish was eaten fresh and much of it raw. In 1778 Cook estimated the population at 400,000.

In 1820 missionaries arrived from the United States, and a little later William Ellis, the celebrated missionary from England, who published a valuable record of his experiences.

In 1823 an eminent missionary, the Rev. Charles Stewart, described the natives as suffering very severely from skin diseases, and used the expression : "The majority are more or less disfigured by eruptions and sores, and many are unsightly as lepers. . . . The number of either sex or of any age who are free from blemishes of this kind is very small, so much so that a smooth and unbroken skin is far more uncommon here than the reverse is at home." It has been doubted whether these expressions imply that the natives really had leprosy, since syphilis had been introduced, and it might be to it that they chiefly applied. No other observer at this date had definitely mentioned leprosy.

Coolie, mainly Chinese, immigration into the islands commenced about 1840, and it was a few years later that the first definite diagnosis of leprosy in a native, by a medical man, was made. In 1859 it was recognised as being then well established in the native population, and it is said that they called it "the Chinese disease," "Maipaki." Dr. Hillebrand wrote about it in 1864, and subsequently several missionary medical men examined the facts. In the meantime an establishment for drying and salting fish had come into existence, and fish preserved in one or other of these ways had become an ordinary article of food.

---

* They really belong to the Mahori branch of the Polynesian family, "Indonesian."

The establishment of a leper segregation home on Molokai was in 1865.* In 1884 Mr. M. Gibson estimated the proportion of lepers as at least 2 per cent. of the population, or 200 per 10,000.† In 1880 the estimated number of lepers then at Molokai was 800. In 1894 the number had increased to 1,152, and was distributed as regards nationality as follows:

Native Hawaiians	1,011
Half-castes	91
Chinese	26
Americans	5
Germans	4
English	3
Irish	1
Portuguese	5
Spanish	2
Canadians	1
Russians	1
Negroes	1
South Sea Islanders	1
	1,152

---

* Molokai is a small island near Honolulu, one corner of which had been selected for the formation of the leper home.

† A previous report in 1862 had estimated the proportion as not less than 5 per cent. of the native population. This estimate was given by

The chief interest in the controversy as to whether the disease was wholly new or otherwise has centred in its bearing upon the doctrine of contagion. If the disease had been present from ancient times it is clear that the risk of contagion had been encountered all along, and it becomes impossible on that theory to explain its former very sparing prevalence or its recent sudden increase. If a native leper could not cause its spreading, why should a Chinese one?*

I do not propose to enter in any detail into this controversy as to whether or not leprosy was an indigenous disease in these islands. The chief facts relied upon, by those who think that it was not, are that the natives in later times called it "the Chinese disease," and did not appear to have a vernacular name for it, and secondly that the early missionaries did not specifically mention it. If we admit, however, that it underwent a very remarkable increase simultaneously with the advent of Chinese, many

---

the President of the Board of Health at the time. It will be seen that it reaches the proportion of 500 per 10,000, perhaps the largest ever recorded by any public authority. India has but 5 per 10,000. It is very possible that we here encounter fallacious statistics, for if we accept the two estimates quoted it will be seen that we have to recognise a reduction of one-half in the space of two years.

* In the American "Journal of Dermatology," March, 1904, asserting that the disease was not introduced either by Europeans or Chinese, Dr. Albert Ashmead writes: "All the competent witnesses hold the following opinion—that there is no record nor distinct tradition of the invasion of the disease. When attention was first attracted to it, cases existed on every island of the group. It was, therefore, epidemic then. It is not known or suggested that any one island was attacked long before the rest, or that any remained free after the rest were known to suffer. Dr. Ashburton Thompson, of New South Wales, says that there is nothing which can be called evidential to support the assertion that leprosy first appeared in the group during historical times, or that it began to become more common between 1851 and 1860. That leprosy took on a bad form in that decade is admitted."

of whom were probably its subjects, we need not wonder much at its receiving their name; and respecting the omission to mention it by travellers and missionaries it is to be remarked that it is doubtful whether the expressions which I have quoted were not intended to include it.* Amongst those who, after careful study of the question on the spot, hold for certain that it was present before either Europeans or Chinese visited the islands, we have Dr. Mouritz (who lived at Motopai), Dr. Arning (who stayed there three years), Dr. Ashburton Thompson, and Dr. Albert Ashmead. Mr. Cantlie ranges himself in the opposite camp, and writes: "The evidence seems complete. Leprosy was introduced into Hawaii by the Chinese, at or soon after the discovery of gold in California." The conclusions of this author on this point are by no means beyond question, for he sees Chinese influence everywhere, and forgetting the important fact to which he had himself called attention, that the inhabitants of southern China have wholly failed to infect those of the north, thinks that they have been the cause of the introduction of the disease into every other country and island to which they have obtained access. The fact that when the disease was first studied by medical observers it was found to be present in all the numerous islands of the Hawaiian group, is in itself almost conclusive against the supposition that it was of recent introduction. It was sparingly present in them all, but it prevailed as an epidemic only in the one in which the fish factory had been constituted. A French medical author, writing in the early part of the last century, asserted that leprosy was an indigenous disease in every island of the Pacific. This statement probably went beyond the truth, but was, I cannot but think, much nearer to it than Mr. Cantlie's scepticism as to whether it existed in any. In New Zealand, for instance, there is no doubt about the fact, for the disease which had formerly been common became extinct under European rule. In Fiji, also, there are "leprosy stones" of unknown antiquity.

---

* Captain King, who completed Cook's "Journal," gives some interesting facts. He writes: "They are in general very subject to boils and ulcers, which are attributed to the great quantity of salt they eat with their flesh and fish. The crees (chiefs) are very free from these complaints; but many of them suffer still more dreadful effects from the immoderate use of the ava. Those who are most affected by it had their bodies covered with a white scurf, their eyes red and inflamed, their limbs emaciated, the whole frame trembling and paralytic, accompanied with a disability to raise the head. . . . The young son of Terreeoboo, who was about twelve years old, used to boast of his being admitted to drink ava, and showed us with great triumph a small spot in his side that was growing scaly." These expressions are suggestive of leprosy.

The suggestion which would best fit the facts as to the rapidly developed prevalence of the disease during the five and twenty years following the advent of Chinese would be that the natives were by them taught to like salt-fish, and that some specially dangerous method of curing it had been introduced. It is a remarkable fact that although the Chinese coolies continued to present many victims, by far the greater number were of the native race. In some other parts of the world where Chinese have carried the disease (California, Australia, and the Straits Settlements), they have remained themselves its chief victims. It was not so in the Sandwich Islands, and the fact proves that some definite change in habit amongst the natives must have been introduced.

The suggestion is by no means improbable that there were amongst the fish-curers one or more who were the subjects of leprosy, by whose hands the fish was contaminated. It seems clear that in some way the bacillus was supplied to the native population in a very active form (see back, page 50).

It is undoubted that a salt-fish factory was formed, and that it was a novelty. Accepting that as the starting-point, there was much in the habits of the people to favour a certain amount of spreading by commensal communication. Dr. Wood, of Honolulu, in a letter to Mr. Cantlie, states that, although the natives believe the disease contagious, "they have no fear of it. . . . They will fearlessly expose themselves to contagion by eating and sleeping and smoking the same pipe with a leper relation or friend." We can have little doubt that leprous mothers continued to suckle their infants, and thus we may explain a statement which was made, after the outbreak had persisted some time, that young children were beginning to suffer.

The writer just quoted (Dr. Wood) supplies the following statement: "Raw fish has been assigned by some as a cause, but is not generally credited. The natives are very fond of raw fish and eat it constantly."

Thus, then, putting aside details, the broad facts as to leprosy in the Sandwich Islands may, I think, be stated as follows:—

The disease has been indigenous in the whole group, but it did not prevail largely until the advent of Asiatics. There has always been abundance of fish, and the natives have used it freely. Prior to the Asiatic settlement they usually ate their fish raw, and only after that event did they become accustomed to salt it. An almost epidemic prevalence of the disease followed the institution of a factory for salting fish. Isolation has been compulsorily carried out for nearly forty years, with the result that the disease has diminished only *pari passu* with the diminution of the native population. No attention has been given to the supply of salt-fish, and even the leper-home has been regularly furnished with it. As regards contagion, the facts have been precisely those observed in other parts of the world. Although many healthy persons have resided in the leper-home with their relatives, most have escaped. Husbands and wives have in many instances continued to live together, one of them remaining free, for twenty years or more. No medical man engaged in studying the disease has ever contracted it.

Although I have, at a former page, referred to the facts, it may not be amiss, in order to complete the present narrative, to again remark that the attempt to exterminate leprosy in the Sandwich Islands by isolation-measures has proved a signal failure. These measures have been carried out with ruthless consistency. On one occasion several Government officers were shot down in an organised attempt to arrest a leper, who, dreading deportation to Molokai, had taken refuge in the mountains. Medical inspectors have scoured the islands, and neither rank nor wealth have availed to protect the sufferers.* Yet, in spite of these persevering efforts on the part of the Government,

---

* The following is Miss Bird's graphic account of the proceedings: "When the search for lepers was made the natives hid their friends away under mats, and in forests and caves, till the period of the separation was over, and if they sought medical advice, they rejected foreign educated aid in favour of the highly-paid services of Chinese and native quacks, who professed to work a cure by means of loathsome ointments and decoctions, and abominable broths worthy of the witches' cauldron. However, as the year passed on, lepers were 'informed against,' and it became the painful duty of the sheriffs of the islands, on the statement of a doctor that any individual was truly a leper, to commit him for life to Molokai. Some whose swollen faces and goggle eyes left no room for hope of escape, gave themselves up; and a few who, like Mr. Ragsdale, might have remained among their fellows almost without suspicion, surrendered themselves in a way which reflects much credit upon them. Mr. Park, the marshal, and Mr. Wilder, of the Board of Health, went round the islands repeatedly in the Kilanea, and performed the painful duty of collecting the victims, with true sympathy and kindness. The woe of those who were taken, and the dismal wailings of those who were left, and the agonised partings, when friends and relatives clung to the swollen limbs and kissed the glistening bloated faces of those who were exiled from them for ever, I shall never forget.

"There were no individual distinctions made among the sufferers. Queen Emma's cousin, a man of property, and Mr. Ragsdale, the most the supply of lepers has continued unabated during thirty years. Some diminution in the number has been recorded of late, but those well acquainted with the facts assure us that it is only in ratio with the reduction of the native population.

influential lawyer among the half whites, shared the same doom as poor Upa, the volcano guide, and stricken Chinamen and labourers from the plantations. Before the search slackened between three and four hundred men, women and children were gathered out from among their families and placed on Molokai."

Mrs. Owen quotes an anonymous writer who wrote of the Leper Island in the Sandwich Islands: "Perhaps no spot on the face of the earth could equal for concentrated misery and hopeless horror the leper establishment of Molokai." In these islands a man, Dr. Jared Smith, locally known as "the beloved physician," was assassinated by a native because he had signed a certificate which would have deported the man's wife to the leper island.

CHAPTER XXX.

LEPROSY ON THE CONTINENT OF NORTH AMERICA.

So far as is known, leprosy was not present amongst the aboriginal populations of the North American continent. The Indians who roamed its inland territories lived chiefly on the products of the chase, but no doubt fished as well. They may have eaten their fish fresh, and were probably not accustomed to salt it. At any rate tradition says nothing as to the existence of leprosy amongst them, whilst it assigns definite dates to its introduction, at various places, from Europe and the East. This vast continent attracted immigrants from all parts of the old world, and it gave them, for the most part, a bountiful welcome. The inland plains produced corn in abundance, and excepting for purposes of commerce there were no inducements to remain at the coast. Nor was there any large immigration of Roman Catholics, to create inland an artificial demand for salted fish. Amongst those who flocked to this land of plenty were many, especially from Norway, who were already the subjects of leprosy. Now what are the facts as regards its spreading? Simply that it took root nowhere inland and only at a few places on the sea-board. Of these, the fishing village of Tracadie, in New Brunswick, was one, and Louisiana, on the Mexican Gulf, was another. In these places it has prevailed now for two centuries, and in spite of all efforts at its extermination it still does so. In Tracadie it has prevailed amongst families of French fishermen who are supposed to have brought the disease with them from Brittany. They live under conditions of great poverty, their vocation is the catching and curing of fish, and during certain periods of the year they are obliged to subsist on that which they have cured. With very rare exceptions the disease does not now affect any excepting this particular class.

The State of Louisiana is a semi-tropical district on the Gulf of Mexico. It comprises the debouchment of the Mississippi, and a large part of its territory is covered with a network of "bayons," or secondary rivers and swamps. Its principal city, New Orleans, is in the most southern portion of this water-logged district. The original settlement was formed by French Catholics, and there is still a large proportion of the Catholic creed in the population. It would be difficult to imagine conditions more likely, if the fish hypothesis be true, to favour the production of leprosy. It must be remembered, however, that the other necessaries of life are abundant and that no one is under any sort of compulsion to eat fish in a bad condition. There are, it must however be added, no fisheries in New Orleans itself, and consequently but little fresh fish is obtainable.

We are in possession of a good account of leprosy in New Orleans, from the pen of Dr. Blanc, a resident physician there. It was written in 1888. The disease, although fairly common, is not excessively so, it affects males and females in the proportion of twenty-six to sixteen, and is not unfrequently seen in white persons. It is not concentrated in any special localities, there is not often any history of heredity, and as to contagion, "the majority give a flat denial as to having ever seen or heard of a similar case." As to food, Dr. Blanc states that salt-fish is eaten, and that "owing to the warmth of the climate it is probable that much of the meat and fish consumed by the poorer classes is not as fresh as it should be."

Of recent years immigrants from China and the East have introduced leprosy on the western coast of America, and at various other places isolated cases have been recognised, always immigrants. In San Francisco there is a considerable Chinese leper population. With the exception, however, of the localities just considered, the seed has always appeared to have fallen on rocky ground and been absolutely unproductive. It is to be remembered, especially in connection with Louisiana, that on the adjacent islands in the Mexican Gulf, which are under very similar conditions, the disease has for centuries been prevalent.

There can be, I would submit, but one logical deduction from these facts. There must be some efficient difference between the West Indian Islands, the sea borders of Louisiana, and Tracadie, as compared with the bulk of the continent, which enables a disease to perpetuate itself in them whilst it cannot thrive elsewhere. That difference must be something quite distinct from climate, race, and ordinary hygienic surroundings. The suggestion of contagion is wholly out of court. We can only believe that some article of food is concerned, and the only article which can come under reasonable suspicion is fish. As a contributory factor we keep in mind that in all the places named Roman Catholicism is the religion of the majority.

It is somewhat astonishing to find Dr. Blanc, with the facts which have been mentioned before him, and which indeed he had himself recorded, arriving at the conclusion that "the only plan likely to prove of permanent benefit to all concerned *is complete and permanent isolation of the lepers*." This is said although a majority of his patients had told him that they had never in their lives seen a leper and that they certainly had not had any relatives affected.

Into California, and more especially into San Francisco, many cases of leprosy have been imported :—Mexicans, Chinese, and South Sea Islanders. From the Sandwich Islands some have found their way, both whites and others, anxious to escape compulsory segregation at Molokai. Although it has been needful to form a hospital for these immigrants, I am not aware that there has been any spreading of the disease.*

From Tracadie, the long-established home of leprosy in New Brunswick, we have most encouraging accounts as to the diminution of the disease. Dr. Smith, the resident physician who has charge of the leper home, informs me that the facts which have come under his observation are in strong confirmation of the fish-hypothesis. Formerly the disease prevailed somewhat inland, but it has ceased to occur there since the development of agriculture. For many years it has been almost absolutely restricted to the fisher population, and is now becoming much less frequent amongst that class also. (See *Polyclinic Journal*, May, 1902, and the *Times* for Jan. 14, 1904.)

---

* The *Medical Standard*, of Chicago, writes as follows: "It is a pity that the public is so ill-informed as to leprosy that it falls into a state of panic at the mere mention of the name, and demands that the poor fellows be practically incarcerated. The disease is contagious, to be sure, but very mildly so. So far as we know, no case of contagion has arisen in this city or environs from the scores of lepers who have been at large in our community during all the past years. There are no exact statistics in regard to the distribution of the disease in the United States, but in 1894 Dr. T. Nevins Hyde stated in Washington that approximately there were about 560 cases known to exist. Of these, 158 were in California, mostly amongst the Chinese, 120 were in Minnesota, and 20 in Wisconsin, among the Scandinavians, and 83 in Louisiana, among the descendants of the Arcadians who emigrated there many years ago. That would leave about 180 for all the rest of the country. Excepting in Louisiana the disease practically does not spread, and there is not the least reason for any alarm or anxiety as to its spread. Our climate, our food-supplies, and the general hygienic conditions that prevail in our country are all opposed to its spread. Since the disease is not at all liable to spread in this city, why should lepers be seized upon and confined for the rest of their lives?"

CHAPTER XXXI.

LEPROSY IN RUSSIA.

THE Russian population belongs, for the most part, to the Greek Church. Fasts are religiously observed, and they are more strict than in the rest of Christendom, since abstinence from fish as well as from flesh is enjoined. At the time when leprosy prevailed over the whole of the western part of the European continent, there was none in mid-Russia. In fact, no occurrence of the disease has ever been recorded in the inland parts of that vast territory. On the shores of the Black Sea, on those of the Caspian, and on various parts of the Baltic coast, leprosy has, however, prevailed, and still does so. In bygone times it had the name of "the Crimean disease." In the words of Dr. Münch, who has written an excellent account of it as observed in Southern Russia, "Leprosy exists only on some of the borders of Russia."

It will be convenient to deal with Southern Russia first and I shall follow Dr. Münch's statements. In Astrachan there may be 100 lepers, of whom one half live on the left bank of the Volga, and the other half in Astrachan itself and in the Delta of the river. At a place called Karatchye, inhabited by a Moslem Tartar race, and on the upper part of the river Cubar, the number of lepers is estimated as high as 1 per cent. In the Don Cossack territory leprosy is found in many villages, but is most abundant near the mouth of the river Don. In the Crimea itself lepers are now but few, and chiefly occur on the south-western shore of the Azof Sea. In Kherson and in its neighbourhood there are some, and in Turkestan more. The disease is nowhere uniformly spread, but occurs in certain villages, with intervening districts which are almost or wholly free.

As regards past history, there is reason to believe that the disease has prevailed for centuries at least, and that it was at one time more abundant in the Crimea than it is at present. In 1839 Prahof reported on it to the Russian Government, in 1862 Oldckop wrote an account of his observations in Astrachan, and in 1869 he was followed by an army surgeon, Dr. Kozlowsky. All these observers rejected the suggestion of contagion; the last named attributed the disease exclusively to inheritance, whilst Dr. Oldckop avowed his belief that it was caused by eating fish.

It will be seen that, on *primâ facie* view, these facts would appear to give strong support to the fish-hypothesis. The disease occurs at the mouths of the three great rivers, Volga, Ural and Don, and on the shores of the seas. Many who have observed it there hold that it is not contagious. Dr. Münch, however, from whom I am quoting, rejects this hypothesis, and avows himself a contagionist. Let us see the reasons for his creed. He formulates his views under three principal heads :—

"(1) The disease may originate under the most varied telluric, atmospheric, social, and economical conditions.

"(2) The disease spreads chiefly in families, among relations.

"(3) A residence, more or less prolonged, in a district where the disease already exists is essential to contracting the disease."

Under the first of these propositions he considers that he has a right to avoid all reference to the views of those who would ascribe the disease to climate, poverty, or any article of food. This right is obtained, however, only if we grant that under the head of "varied economical conditions" we are to include a dietary into which fish does not enter. With this exception, those who contend for a food origin may freely accept all three propositions. Leprosy has certainly no relation to climatic or telluric conditions. It does often spread in families, for the suggested reason that families often use the same food (nor do we deny commensal communication), and residence in a leprosy district is, for the most part, essential to its acquisition, for the reason that there, almost exclusively, is the dangerous food to be found. This last point must not, however, be pushed too far, for sporadic *de novo* cases, although rare, do undoubtedly occur. Coming to more explicit statements, Dr. Münch asserts that leprosy in Southern Russia is met with, not only on the sea, but at great distances from it (Turkestan); and at a height of 4,000 feet above its level (Karatchye); in districts abounding in fish, and also among populations which never use that article of diet (Karatchye and Turkestan); amongst peoples living in comparative cleanliness and plenty, and among those who never change their clothes until they drop off their shoulders (Karatchye).

Now the whole gist of the question lies in the determination as to whether the inhabitants of Karatchye and Turkestan really do not obtain cured fish. That they live at great distance from the sea may be held to exclude fresh fish, unless, indeed, from rivers, but it does not by any means make it improbable that they obtain fish which has been dried, and Dr. Münch's statements do not imply that he has made any inquiry in that direction. Until this is done all argument is useless, for we are not sure of our fundamental facts. Dr. Münch tells us that the Tartars in Astrachan, who live in villages near to those of the Russians, but isolated from them, seldom or never contract leprosy. This he attributes to exemption from contagion, but it is quite as likely that it is due to Tartar abstinence from fish. He tells us that the Tartars have not even a name for leprosy, and that amongst the Kalmucks, also, the disease is very rare.

Although an advocate for contagion as the exclusive cause of the spread of leprosy, Dr. Münch admits that "we know little or nothing of the conditions under which it becomes contagious," and that we "must regard the poison as anything but energetic." He records the case of a woman who asserted that she had never even seen a leper.

Respecting *Turkestan*, the position of which, in Central Asia, appears to Dr. Münch to preclude fish eating, it is to be remembered that it borders on the immense but shallow sea of Aral. This sea "abounds with fish of various kinds, as the sturgeon, silurus, carp, and especially a species of herring" ("Encycl. Britan."). Thus, instead of forming any obstacle to the fish theory of leprosy, its prevalence in that district remarkably confirms it. Did we know more as to the precise distribution of leprosy in Turkestan, I will venture the guess that we should find that it occurs near to this sea or in places in direct communication with its shores. The Aral sea is 265 miles long, and comprises the deltas of the Oxus and Jaxartes.

A very interesting collection of excellent photographs of lepers has recently been published by Dr. Grünfeld, of Odessa, with a preface by Dr. Lassar, of Berlin. This work comprises portraits of no fewer than eighty lepers, and its examination is, without the trouble and expense, almost as useful as a visit to a leper home. The vocation of all the patients is given. All are from the great fishing district of the Delta of the Don. Neither Dr. Lassar nor Dr. Grünfeld think it worth while to say one word as to the fish-hypothesis, and it becomes, therefore, of much interest to note that out of sixty-three men, whose cases are given, no fewer than twenty-seven were actually fishermen.

It is necessary to omit the whole of Central Russia, for leprosy is absent, and we do not encounter it again until the shores of the Baltic are reached.

Dr. Oscar Petersen, a distinguished physician resident in St. Petersburg, writing of leprosy in the Baltic Provinces, and reporting some recent increase, says: "Leprosy occurs independently of climate, independently of soil, and independently of food. Fish plays no part in its spread. The fasts also, which the Russian people keep very rigidly, have no influence. Against Hutchinson's view I must especially mention that the bulk of lepers in the Baltic Provinces are Protestants."

Now, inasmuch as the fasts of the Greek Church forbid fish, it is not likely that they would encourage the spread of leprosy. On the other hand, they may to some extent protect from it. The Protestant in the Baltic Provinces may, if he likes, eat salt fish every day of the week, whilst the orthodox member of the Greek Church can eat it only on five out of the seven. The prevalence of leprosy in the Baltic Provinces, however, has probably little to do with creed, but occurs simply because the provinces are on the Baltic, and are great fishing districts. What reasons may have impelled Dr. Petersen to write that fish plays no part in its spread it is difficult to guess, for all the facts which he records appear to support the inference that it does do so. He especially mentions the island of Œsel and the district of Lirland as haunts of the disease, and they are both the homes of fishermen.

As regards these Baltic Provinces, Dr. Hellat (see *Leprosy Journal*) has recorded that "The number of lepers in certain districts is as much as 2 per cent. of the population." This amounts to the proportion of 200 per 10,000, in contrast with the Indian 5 per 10,000.

In reference to isolation, he adds "Our peasants are not such great fatalists as in Norway, and therefore not so tolerant, but rather the reverse. Every leper is avoided as much as possible and not infrequently prohibited from all communication. Many of them live in the provinces; others again prefer suicide to the slow death."

Dr. Hellat is, like Dr. Petersen, a contagionist. He rejects heredity, and as to food states: "Food, climate, dwelling, are irrelevant in originating the disease." This is written in spite of the facts that the districts in which he records such terrible prevalence are pre-eminently fishing places (on the Gulf of Riga), and that the disease persists in them, notwithstanding the social isolation so cruelly enforced by the inhabitants.

Dorpat, where leprosy occurs somewhat inland, is on a river and in close proximity to a large lake, from which, no doubt, much fish is obtained.

Leprosy is reported to be spontaneously disappearing from Finland. It was formerly very prevalent, and is now rare. It is a remarkable fact that it is during this period of decline that herrings have deserted this part of the Baltic.

A glance at a leprosy map of Russia would certainly lead the observer to believe that the disease must in some way be connected with the sea-coast. It is terribly prevalent on the shores of the Gulf of Riga, the island of Œsel, and on the Baltic sea-board; it is wholly absent in the interior, and it occurs again on the coasts of the Aral, Caspian and Black Seas. In almost all parts where it is prevalent in great excess its centre is a delta and a fishing district. Yet with one voice three able investigators, Dr. Münch, Dr. Petersen, and Dr. Hellat, declare that food has nothing to do with its incidence. None of them, however, offer the slightest explanation of these very obvious peculiarities in its distribution. All three declare in most confident terms that it is a contagious disease, and avow with enthusiasm their belief that isolation measures will "stamp it out." Yet no one of them offers any suggestion as to the exemption of the interior, an exemption which has prevailed for ages, and which must be deemed inexplicable on any other theory than that the disease is dependent, not upon contagion, but upon local conditions. Why should a contagious disease be capable of spreading only within easy reach of a sea ?

Dr. Hellat announces himself as "Member and Founder of the Chief Committee for stamping out Leprosy in the Baltic Provinces of Russia." All will wish him success, but there will be many who will feel great doubt as to whether he is taking the proper methods.

NORTHERN RUSSIA AND SIBERIA.

The prevalence of leprosy at various places in Northern Russia and Siberia has recently attracted some attention. It is believed to be of recent origin, and none of the published maps showing the prevalence of leprosy mark any in these districts. It has developed, I believe, almost exclusively in connection with penal settlements, and at all these the use of salted fish has been liberal. It is the Russians themselves who have been the chief sufferers. Some of the statements which have found their way into print are far from being trustworthy, and the data as yet accumulated are not abundant. There is, however, no doubt that nothing in the least exceptional to the fish theory can be alleged, whilst there is much to confirm it. No suggestion has been made as to the introduction of the disease by immigrants, and it would appear to have been apparently of self-origination in various places as soon as settlements were formed.

We may, perhaps, take the most easterly district of Russia, on the shores of the sea of Okhotsk, as fairly representing what has occurred at other places. Mr. C. N. Hawes, in his interesting book entitled "The Furthest

East,"* has given us some valuable information. Writing from Nikolaivesk (on the mouth of the Amur), Mr. Hawes tells us:—

(Page 62.)

> "At the mouth of the Amur . . . salmon (*S. lagolephalus*) and shad swarm, . . . the price at Nikolaievsk for a moderate-sized salmon, say 18 lbs., was . . . 1½*d.* Salted, it forms the staple food of the natives and poor Russians.
>
> "To lack of variety, the absence of vegetables, which will not grow in Nikolaivesk, and the unhealthy conditions of living, must be attributed the leprosy among the Russians on the Amur. . . ."

(Page 63.)

> "Most of this salted salmon goes to supply Eastern Siberia, the migrant population, and the convicts, and some is exported to Japan in casks. . . ."

(Again.)

> "If similar methods are to be employed in the canning of salmon that were used in the curing of the salted article, then tinned salmon, at least the Russian article, will become a food to be avoided more than ever. . . ."

(Page 69.)

> "At Nikolaivesk meat is dear and vegetables scarce; therefore salted fish and black bread form the staple diet of the criminals. Owing to the absence of transport during winter the accumulation of provisions results sometimes in the fish being a year old before it is consumed."

In a letter to the *Daily Chronicle*, October, 1893, Mr. Hawes wrote: "I am bound to confess that the pickling of salmon which I saw being done by the ex-convict workmen inspired me with no desire to partake of the conserve."

---

* I am indebted to Mr. E. V. Bacon, of Lymington, for calling my attention to this work.

CHAPTER XXXII.

LEPROSY IN THE TRANSVAAL.

Amongst the more recent literature of leprosy we have a statement published at the Government Printing Works of Pretoria, in which Dr. Turner, the able medical officer of health for the Transvaal, endeavours to show that the facts under his observation do not support the fish-hypothesis. Dr. Turner has laboriously collected a large array of statistics, and reasons upon them with much acuteness. It may be well, therefore, that I should devote a chapter to their examination; and I am the more willing to do so inasmuch as his report having been written since my visit to South Africa, and being in reference to my statements, I may, not improbably, in answering him, at the same time reply to doubts which others have also entertained. In the first place I may be permitted to say that Dr. Turner's Report adds another to the many in which a local observer deals only with local facts, and forgets to consider those which have accrued in other parts of the world. He assumes that the disease is contagious, but makes not the slightest attempt to confute the voluminous evidence which dissuades from that opinion. Throughout his report he also to some extent misconceives as to what the present position of the fish-hypothesis really is. For this I must myself take some of the blame, for the terms in which I would now express it differ in some respects from those of my earlier writings. It is no longer thought that mere excess in fish-eating is in question, or that fishermen or fish-dealers are those most likely to suffer. The present suggestion is that the bacillus is developed by fish under conditions of decomposition which are probably very exceptional, but always possible where that article is used. Thus a very small quantity may suffice, and one parcel of the commodity, eaten imperfectly cooked, may infect many, whilst the great length and the irregularity of the incubation-period make it almost impossible to trace the date of reception. This creed being kept in mind, it avails nothing to show that the fish-eating of the Transvaal is but small, probably much less than that of England; for all the English fish is sound, whilst much of that of Johannesburg and Pretoria is bad. Nor are we concerned with elaborate statistics to show that the Uitlanders who eat most of the imported fish, and the Malays who are often fishermen, suffer less than some other classes. The reply is ready that the Uitlanders take care to get good fish, and that the Malays are fish-providers rather than fish-eaters. In many regions besides the Transvaal they (the Malays) appear to suffer rather less than some other races with which they are mixed, and this is probably explained by the fact that they are careful feeders, and that, as fishermen, they have opportunities for getting fish in a fresh state.

Dr. Turner, commenting on the statistics he has collected, writes: "The results obtained by the two calculations tell the same story. Excepting those of European race, the Kaffir is the least affected; then in order comes the Malay, the worst being the Hottentot." Now this is precisely the order which the fish-theory would lead us to expect. The white man will not eat bad fish, and can afford the best. The Kaffir has a prejudice against all fish, but will eat it under great temptation, and prefers it when decomposed. The Malay obtains it for others to eat, whilst the poor Hottentot has no prejudices and takes all he can get without regard to condition. The comparative exemption of the Cape

Colony Kaffir* has been pointed out by others, and is a strong fact in favour of the fish-theory. I have been assured over and over again by those who knew the Kaffirs in Natal that no Kaffir would touch fish in any form. That this is not absolutely true, I obtained abundant evidence, but at the same time it may be held to imply that Cape Kaffirs have a strong prejudice to fish, never eat it at home, and will never willingly admit that they have eaten it elsewhere. For this comparative exemption of Cape Kaffirs, neither Dr. Turner nor any other writer has, so far as I know, offered the slightest explanation. The fish-hypothesis is, as in so many other cases, the only one which touches it. From much personal inquiry amongst Natal Kaffirs who had been to the Johannesburg mines, I am in a position to state that the use of salt-fish as food was well known to them all. It is true that they usually denied, for themselves, having eaten it, but one and all said that most of their race, when at the mines, did so. They called it "sack fish," thus designating the coarsest and least well salted of all forms of Cape fish, and they often described its smell with great emphasis of affected disgust.

It is a little remarkable that Dr. Turner should have overlooked this obvious inference from evidence which he had himself collected. He is at some pains to assert that the Basutos, a tribe closely allied to the Cape Kaffirs, will not under any circumstances eat fish. As I have repeatedly stated, I do not believe that these negative assertions are strictly true of any tribe of Kaffirs, nor, for the matter of that, of any tribe or sect in any part of the world. At the same time, I feel sure that there is amongst Kaffirs a strong prejudice against fresh fish, and that relatively to

---

* The Cape Census for 1900, quoted by Dr. Turner, records: "Leprosy was twice as common amongst the Hottentot as amongst any other race. . . . The Kaffir showed the smallest amount of this infirmity, excepting only Europeans."

Hottentots they eat but little of that which has been salted.

In order to show that but little fish is eaten in the Transvaal, Dr. Turner has obtained from the Director of Customs a return of the fish imported into the State. It deals with the four years 1895-6-7-8. That which concerns the salted fish received from Cape Colony is the part which almost solely affects our present inquiry. In this a very remarkable statement occurs. In the year 1895 no less a quantity than 270,000 lbs. paid duty, whilst in the year next following only 41,000 lbs., or not much more than a seventh, is recorded. No explanation of this sudden difference in demand is offered, nor is my knowledge of the history of the mines sufficient to suggest one.* If, however, this were a year in which the failure of meat supply or the unusual activity of the mines created an extraordinary demand for fish, it may easily be the fact that from this year much of the leprosy now extant in the Transvaal dates. It is just such a demand which would be likely to deteriorate the quality. Remembering, however, the huge error which was detected in the statement by authority that more than 4,200 tons of fish were supplied daily to London (see former page), I cannot help a suspicion that there may be some mistake here. I only hope there is not.

Dr. Turner somewhat plaintively adds that he has laboriously, but without result, compared the local incidence of leprosy with a number of varying social conditions, such as density of population, size of house, &c. My impression is, that a wider recognition of the already proven facts as to leprosy in other parts of the world might have justified him in sparing himself not only this but certain other parts of his painstaking inquiry. The lengthy and laboured table which records the result of inquiry in the Pretoria leper asylum as to who had and who had not eaten fish, is, for me, without value. I trust I have given already in reference to Indian asylums sufficient evidence to justify my entire rejection of evidence of this kind. Of Dr. Turner's inmates the Europeans only would be those who felt the slightest sense of duty as to speaking the truth. The Kaffirs would one and all deny having eaten fish, for fish-eating is a disgrace to a Kaffir. Of the rest, many, if they had any inkling that fish was blamed for their malady, would deny having taken it, and of all it is true that unless it were very carefully explained they would misunderstand the question and suppose that habitual fish-eating was meant. The chance occasion might indeed have been quite forgotten. I shall be accused, I well know, of special pleading, but I feel sure that what I am saying is the common-sense of the matter.

---

* It is, perhaps, possible that this sudden drop was in connection with interrupted importation following the Jameson Raid.

Although it is not expressly stated, I infer from Dr. Turner's criticism of some of the evidence which I adduced as to leprosy having been unknown in South Africa prior to the advent of the Dutch, that he is inclined to hold that it was probably indigenous. I quite agree with his statement that the negative evidence of missionaries and others who did not see cases is of little value, but I attach very great importance to the investigation by the Cape Town authorities in 1756 of the three cases occurring in Dutch farmers, which, it is evident, they then thought to be the only ones in the colony. To this investigation Dr. Turner does not allude.

Near the end of his report Dr. Turner writes, "And certainly in South Africa there is not a particle of evidence to support the theory that fish is an agent in the spread of leprosy, much less an important one." To this I make reply that, putting aside misleading details, the large facts are obvious. The advent of the disease to the colony was subsequent to the development of fish-curing at Cape Town, and occurred amongst people (Dutch farmers) notoriously fond of salt-fish. The disease spread from Cape Town, as a centre, *pari passu* with the increase of the fishing industry and the formation of roads, and it still affects chiefly those who eat most fish (the farm servants and miners). Lastly, even by Dr. Turner's own showing it almost exempts the Kaffirs, the one race reputed to avoid fish. To this it is perhaps fair to add that human ingenuity has not yet suggested any other explanation of the facts having the slightest plausibility in its favour.

It is worth adding in connection with the Transvaal and the Orange River State that the recent war no doubt had the effect of stopping the importation of salt-fish. If in future years there should, in this connection, be a definite reduction in the number of lepers, it will doubtless be at once claimed as the result of the segregation efforts which have been made. We may hope, also, with some degree of confidence, that improvements are gradually taking place in the methods of curing adopted at the Cape fisheries, and further, that with the advance of knowledge in the general population there will follow increased care as to the consumption of "sack-fish" in bad condition. These unobtrusive agencies must not be lost sight of in estimating results. We must avoid in South Africa the error which is, I am forced to believe, now being committed in Norway of attributing sequences to wholly unimportant measures.

CHAPTER XXXIII.

LEPROSY IN CRETE.

The beautiful island of Crete has for ages had a bad repute as to leprosy. The disease has always been common there, and it has persisted in spite of measures for its repression. One part of its population, the Sphakiots, have, however, it is believed, always escaped, and on the most recent testimony, they are exempt at the present day. These Sphakiots are of the same mixed descent as the rest of the population, but have acquired almost racial peculiarities by living in the mountains. They are Highlanders, and being brave soldiers, have never submitted to the Turkish rule. The total population of Crete is between two and three hundred thousand. About forty thousand are Mohammedans, but most of these are Cretans and not Turks. Greek is the language universally spoken. Candia, Canea and Retimo are the only towns of importance and are all on the coast. There are no rivers, and by far the greater part of the surface of the island is occupied by mountain ranges. Excellent fruit is abundant, there is good pasturage, and there ought to be no scarcity of food, but bad government and wars have so far impoverished the country that a large part of the population live in great poverty, subsisting chiefly on olives and bread. Bread dipped in olive oil with a little strong wine is the principal diet of the poor, but snails, mussels, crustaceans and fish are also eaten. It may be remarked in passing, that as the fasts of the Greek Church exclude fish as well as flesh, there will not arise that special demand for this article which occurs everywhere under the Roman Catholic *régime*. This may be of some importance as regards the immunity of the Sphakiots. At a great distance from the coast, they would get no share of the produce of the sea in a fresh state, and not being allowed to eat fish on fast-days they would be under no temptation to import it in a dried state into their mountain villages.

Respecting the prevalence of leprosy I find the following in Hirsch's Handbook.

> "But the chief seat of leprosy in this part of the Mediterranean is Crete. An examination made there in 1833, of persons notoriously leprous, gave a total of 628, of whom 522 were in the province of Candia, 64 in Retimo, and 43 in Canea ; but many more patients who had only lately become leprous or who had been hidden by their relatives, remained uncounted. We shall not go far wrong in following Smart and placing the number of lepers living on the island at 900, giving a ratio of 3·6 per thousand of the population. A more recent report by Brunelli confirms this."

Recent numbers of "Lepra" have contained an elaborate report on the present condition of Crete as regards leprosy, by Drs. Ehlers and Cahnheim. These gentlemen visited the island as a commission of inquiry and had every assistance from the Government, and the result is a document of high importance.

An abstract of their observations appeared in the *British Medical Journal* for July, 1900, from which I extract the following :—

> "According to Dr. O. Cahnheim, of Dresden, and Dr. Ehlers, of Copenhagen, leprosy is on the increase in Crete, but Zambaco Pasha's estimate of 4,000 is immensely exaggerated. The investigators found 380 lepers, of whom they personally examined 293. Of these 153 (92 men, 61 women) were of the tubercular, and 170 (79 men 91 women) of the anæsthetic form. The figures quoted appear to warrant the assumption that the total number of lepers in Crete is from 600 to 800."

Those who still think that the leper-houses of the middle ages were the means by which the disease was exterminated in the greater part of Europe will do well to study the history of the disease in past and present times in Crete. Dr. Ehlers, and his colleague tell us that "from time immemorial it has been the custom to isolate lepers in Crete." If a person is suspected he is compelled to submit to medical examination, and if the diagnosis is affirmed, be chased from his village and obliged to seek refuge in one or other of certain homes (four in number) provided outside the great cities. He adds "although no law enforces these rigorous measures yet the practice is observed and followed as severely as if there were a law."

Following at once on these statements the same authorities admit that leprosy still flourishes in Crete. They are contagionists still, and being obliged to explain this obvious failure of segregation they state that detailed examination of the measures adopted show that "the isolation is altogether illusory and more hurtful than useful."* Yet there can be no doubt that it has been, for ages, far more nearly complete than it ever was in England and that it has exceeded immeasurably anything now attempted in Norway.

Some not unimportant facts as to the manner in which segregation was carried out in Crete during the latter part of the last century are given by Captain Spratt.† He writes (under date 1865):

> "This day there were eleven lepers waiting at St. George's Gate for the charity of passengers, and as they were an interesting group I stopped to make some inquiries of them, which they freely answered."

After describing one of the worst cases, an old man who occupied a hut by himself, he continues:

> "Sad and singular it was to learn that he had only been joined by his daughter about ten days previous. She at the age of eighteen, and

---

* "On voit bientôt que l'isolement est tout à fait illusoire, plutôt nuisible qu' utile" (p. 26).

† "Travels and Researches in Crete," by Capt. T. A. B. Spratt, F.R.S.

leaving a mother behind, had then, at the age of hope and promise, been driven from her village home for ever, to be an outcast from friends and relations, in companionship, and with the stigma of a leper. . . . On first seeing her, although seated amongst the unmistakable lepers, I could not believe that she was one of them, being of considerable beauty though pale. . . . I was induced therefore to ask if she really was a leper. She immediately showed me her hands, still delicate and fair, but with two of her fingers slightly bent and stiff. These symptoms, unmistakable to those who know the early appearance of the disease, had only appeared on her about six months previously, when she was immediately placed under the surveillance of the matrons of the village, who then jealously watch any suspicious spots, from a general belief in its contagious nature. The signs of the malady becoming more developed and evident during this time, together with the fact of her father being also a leper, were considered decisive. She was consequently now driven from her home, to become for ever the companion of corruption and misery. . . . By the side of the girl were seated two lepers, man and wife, who had had a child, now six or seven months old, and lying in the arms of the latter, and which had been born to them after being married and residents in the leper village eight years. I learn that about seventy families compose this village, of which thirty-two are Turks, numbering in all 111 persons. . . . 'To be put under the ground would be better than life,' was the feeling reply of one poor woman with whom I had exchanged a few words."—Vol. I., p. 39.

Captain Spratt did not fear to make himself personally familiar with the leper villages,* and his descriptions are well worth reading by anyone desirous of being brought into closer sympathy with the miseries of leprosy. His statements disclose incidentally some interesting facts. At one village he found "a Cretan Turk located with his leper wife and the only untainted inhabitant in it. He had resided with her for several years without becoming a leper likewise, and consequently had the privilege of free access to his mosque and to the neighbouring cafés." In connection with this escape of one who apparently ran great risk it may be added that Dr. Ehlers mentions having found in one leper home persons who were the subjects of other diseases than leprosy.* As a matter of fact there are in almost all leper establishments some in whom the diagnosis is erroneous. The Indian commissioner mentioned such repeatedly, and in no single instance is it stated that such persons, plunged as it were into a very vortex of contagion, ever became lepers.

---

* In reference to contagion he writes: "They regard it as a very contagious disease, and the touch of a leper would paralyse them with fear."

Drs. Ehlers and Cahnheim give us an important item of information as regards the possibilities of commensal communication in Crete. He states that the lepers keep goats, milk them with their ulcerated hands, and sell the milk in the town market. Drs. Ehlers and Cahnheim, who are determined advocates of segregation, give us but little information as to the fish-eating habits of the Cretan community. They admit that fish is eaten by all, but speak as if it were only small in quantity. Captain Spratt is more explicit, and speaks of "fish, often rancid and of the worst sort," as constituting one of the principal portions of the diet of the poor. From Consul Biliotti, resident at Canea, we have yet more detail.† He mentions salt fish, amongst "other articles of very inferior quality," as an ordinary food, and says that the disease is "less common among the Mussulmans, who are cleaner in their dwellings, and who eat much less salt fish." The only objection which he alleges against the theory that fish plays an important part, is that "the disease is comparatively rare in towns all of which are on the coast, but which are not well supplied with fresh fish, so that even in them there is a considerable consumption of salt fish." The reply to this objection is simply that amongst town residents who have easy access to shops there is much less temptation to keep salt fish too long than occurs in the case of the outlying peasantry. It is a common observation in all countries where leprosy is endemic that the inhabitants of towns suffer less than country people.

---

* This refers only to those under confinement as lepers, and does not include voluntary residents. Respecting the latter our authors make the astounding admission that there are many hundreds. "Les habitants du léprochorion de Candie sont au nombre de 900. Ici comme dans les autres léprochoria ce sont toujours les mêmes raisons matérielles et economiques qui incitent des personnes saines à venir vivre au milieu des lépreux."—Page 134.

† See *Leprosy Journal*, Vol. III., page 48.

CHAPTER XXXIV.

LEPROSY ON THE CONTINENT OF AUSTRALIA.

THE facts as to leprosy on the continent of Australia have been recorded with most praiseworthy industry and excellent judgment by Dr. Ashburton Thompson, now the Medical Officer of Health for that country. Up to the year 1894, they may be found in easily accessible form in one of the essays for which a prize was awarded by the "Prince of Wales' Committee." For the years which have since elapsed, the annual reports of the Board of Health must be consulted. In these, Dr. Thompson has recorded the details of almost every individual case of leprosy which has there come to light. The reporting of cases is now compulsory, and although, no doubt, a few still escape, they are probably not many.

Two principal lessons may be learned from the facts which Dr. Thompson has collected for our use. The first is that no conditions of savage degradation will of themselves conduce to leprosy, and secondly, that there are countries in which the disease cannot flourish, of which Australia is a very noteworthy example. It is well nigh certain that leprosy did not exist amongst the indigenous races, and that since the advent of Europeans it has been introduced over and over again, and has nowhere found a congenial home. It will be desirable to enter into the consideration of both these statements in some little detail. Before, however, doing this, it may be well to remark that they fit well with what might have been expected. The aborigines were hunters who had but little opportunity for fishing, and they lived on roots, kangaroos, ants' eggs, etc., rather than on fish. The country is not on any large scale productive of fish. Its seashore is an unbroken line, and its waters deep, whilst inland there is great deficiency of water, and the plains are dry and covered with scrub. Even up to the present time, with the help of the appliances of civilization, there is no large fishing industry in Australia and with little or no exception, no fish-curing whatever. Other articles of food are abundant, and religious creed has never to any great extent come into play to give stimulus to the importers' trade. Although some excellent table fish are obtainable, the supply is small, and it is probably all consumed whilst quite fresh.*

In reference to the absence of leprosy amongst the aborigines we encounter the same difficulties which are met with in the case of Cape Colony and some other places. It is difficult to prove a negative, and especially so in the case of events long passed, concerning which only imperfect testimony has been recorded. Dr. Thompson's conclusion is, however, very decidedly adverse, just as it must be to any careful enquirer in the case of the South African Hottentots. Neither in South Africa nor in Australia was the disease leprosy known until the advent of Europeans. In both instances, it has since that event spread amongst the native races to some extent, thus making it clear that under favourable circumstances they are not immune.

The facts as regards such spreading are, in the case of Australia, instructive. The localities in which it has gained foothold are quite restricted, there has been no wide diffusion. The affected areas are all on the north coast, and almost exclusively amongst those engaged in the pearl fishery. This industry is of quite recent introduction, and has been originated by immigrants from China and the Malay islands. It is certain that these men have introduced fishing and that they cure trepany, and we may fairly assume that they have also taught the natives to eat fish. One of the spots concerning which Dr. Thompson obtained most evidence as to the existence of leprosy amongst natives is the Alligator River district. This district is part of the large promontory west of the Gulf of Carpentaria, and contains the Eveleen silver mines. Here the disease is supposed to have been introduced by Malays, and we are informed that "The blacks have always been as friendly with the Malays as they have with anyone else living among them. The Malays brought trade which they wanted, and the blacks in turn collected tortoise shell, pearl shell and trepany to exchange with them." This instance must suffice. It is obvious that the facts suggest a novel diet quite as strongly as personal contagion. After all, the cases have been but few in number and are not all authenticated beyond doubt.

---

* "The only deep-sea fisheries now carried on to any extent in Australia are the pearl fisheries in Queensland and West Australia."—"Enc. Brit.," 799, Vol. XXV.

As a general result of his Australian experience, Dr. Thompson has recorded his conviction that there is nothing that favours belief in contagion, and much that suggests that the disease has some other mode of origin.

If we pass now to the consideration of the occurrence of leprosy amongst immigrants and settlers we have some remarkable facts submitted to us. Respecting Victoria, Dr. Thompson writes as follows:

"Although lepers were imported to Victoria steadily during a long term of years and in considerable number, and although they always remained entirely unrestricted in their movements among the whites, no Victorian native white who had never left the colony has ever been attacked. Moreover, the disease died away in Victoria quite independently of restrictive measures against the liberty of lepers, which, in fact, were first taken only in March, 1893."

This statement does not, however, apply to other parts of the Commonwealth. In New South Wales, Queensland, and West Australia a certain number (very small) of scattered cases have occurred in white persons who had never left the colony. These have been for the most part wholly unexplained. Fish-eating is universal, but on this point no details are forthcoming. It is probable that the number of these cases has been exaggerated owing to difficulties in diagnosis. In several it is recorded that those who saw the patient differed in opinion as to whether it was leprosy, and the narratives given in others leave more of doubt than conviction. A physician to the Sydney Hospital, who stated that "six well marked cases in native born subjects of European parents" had been under his care in that institution, added that the cases which presented themselves in an early stage of the disease had readily yielded under a liberal administration of cod-liver oil, generous diet, and a carefully regulated course of arsenic. Such successful results, so roundly averred, cannot but induce some hesitancy as to whether all the cases were really leprosy. The statements, however, afford conclusive proof that no fear of contagion was felt, the cases having been treated no doubt during long periods in the general wards of the hospital. Indeed, the same physician goes on to add definitely: "It is gratifying to be able to state that in this stage the disease is not contagious unless under peculiar circumstances." Dr. Thompson gives the cases referred to in considerable detail, but appears to be himself not without doubts. The cases which are to be found in his essay of this kind, which are really unquestionable, are exceedingly few, and his own personal experience would appear to have been almost absolutely confined to the Chinese. Respecting the latter, he gives us much interesting information.

It may be scarcely necessary to remind the reader that from time to time the discovery of gold in Australia has attracted shoals of population from almost all parts of the world. Dr. Thompson tells us that it would scarcely be possible to name a single leprosy-infected country which has not sent representatives. This immigration began in the middle of the century, and Ballarat, in Victoria, was one of the foremost, both as to time and the character of attractions offered. China supplied by far the largest contingent, and the islands of the Malay seas came next. Up to quite recent years no restrictions to such immigration were in force.* The statements just quoted apply to the region in which Ballarat and its goldfields are situated, and their importance is much increased by this circumstance. The opportunities for the introduction of leprosy must have been manifold. The conditions of this colony at the time mentioned may be suitably contrasted with those occurring in the Sandwich Islands about the same time. Both regions attracted Chinese immigrants, some of these no doubt being lepers. In the Sandwich Islands the disease spread freely, whilst in Victoria it died out. What was the cause of the difference? In Victoria but little fish was obtainable, whilst in Honolulu it abounded, and the immigrants initiated a fish factory for salting, etc. The favourite vocations of the Chinaman, wherever he goes, are those of market gardener and cook. In the latter he has to exercise his ingenuity on such articles as he can obtain, and in Australia the supply of fish is but small. Dr. Thompson tells us:

"Fish, in one form or other, is generally available either from the sea or from rivers and lakes, or else canned. Very rarely is it smoked, and the manner of preparing and eating fish in Australia is in every respect the same as in

---

* In 1871 the population of Ballarat amounted to 48,000, and included "a large number of very degraded Chinese, who were huddled together in a separate quarter."—See "Enc. Brit."

England. The uninformed traveller would not suspect that his food had often been dressed by Chinese at the inns he had visited ; in other words, the Chinese in Australia do not introduce either new articles of diet or new ways of cooking."*

It may be suggested that it is precisely this inability in Australia to supply new articles of diet which has prevented the Chinese becoming a source of danger even to their own countrymen. They fail to spread leprosy there for the same reason that they fail in northern China, simply because there is a scarcity of fish. It may be plausibly presumed that almost all the Chinese lepers in Australia have received the germs of the disease before leaving home. Almost all of them come from the leprosy districts of South China, and the development of the disease occurs in all cases well within the limits of the incubation period. As regards the absence of any evidence of contagion, Dr. Thompson gives us definite statements.

"If lepra be directly or indirectly communicable, it should have spread among the Chinese, for everywhere, and always in Australia, they have lived at very close quarters with each other. Yet no considerable prevalence of the disease among them has ever been recorded; at all events, therefore, no evidence of such spread exists. But I am satisfied that the recorded number of cases among them is far from representing the true number. I believe that many Chinese have returned to China on recognising the first signs, and most likely other Chinese lepers have been overlooked, or, if observed, have not been recorded. The number of unrecorded cases cannot be estimated, of course; and if it be thought most probable that the disease did not appear among the Chinese sufficiently often to warrant a suspicion of 'spread,' of which I have myself no doubt, the following explanation might be suggested: that the Chinese being familiar with the signs of leprosy, were in a position to effectually separate the sick from the healthy at an early stage, and thus, though living under circumstances of apparent close contact, would enjoy an advantage over the whites, although the latter habitually lived in apparent separation from them. The weight of this suggestion depends on the view of lepra practically taken by Chinese of the class met with in Australia—the coolie class, or one very little above that for the most part. My own recent observations lead me to agree with the opinion expressed by Dr. McCrea, of Victoria, five-and-twenty years ago. I doubt much whether the Chinese in Australia practically fear leprosy as a communicable disease. From actual occurrences I know that they will continue to harbour and to associate with lepers, provided the latter are either still able to work or have money. Practically they show anxiety to get rid of lepers only after the existence of cases has become known to the whites, and then only because they know the fear with which the whites regard the disease, and because they desire to avoid aggravating the common prejudices against their nation which the whites entertain; and they voluntarily expel lepers or report them to the police, only when the sick are destitute and unable to keep themselves. Thus if lepra be directly or indirectly communicable, it should have spread among the Chinese, who lived in contact with the lepers among them, and who possessed whatever racial predisposition to the disease the southern Chinese may be thought by some to have; but there is no reason to think it did so, or, in view of the remarks made under Sect. XVI., it can have done so only in very few cases at most."

---

* It has occurred to me as quite possible that the article known as "Trepany" or "Bêche-de-mer" may range with fish as an occasional cause of leprosy. It consists of the dried bodies of the sea-cucumber, a holothurian echinoderm, and is of several different qualities. It is an article of luxury in the East, especially amongst the Chinese and Japanese. It is prepared by drying, and, from the "Encyclopædia Britannica," we learn that, being very hygrometric, it rapidly absorbs moisture, and is prone to undergo decomposition. We are not informed what is done with the article when thus spoilt or partially spoilt. It may be that it is still consumed by the poorer classes ; sound trepany is for the rich only.

Dealing with the antecedents of the Chinese lepers who came under his observation, Dr. Thompson bears important testimony to the possibility and frequency of what some have ventured to call *de novo* origin. He writes:

"I refer to my own experience under this head. This has been small, but carefully observed under circumstances which render it likely that the data are complete. I say, then, that it is as certain as anything of the kind can be that in the Cases 34, 36, 40, 43, 51, 53, 54, and 70 at the least (see Appendix, N.S.W., and Table XXVI.), there never was at any time conscious contact with any leper. This conclusion rests on almost minute inquiries made among relatives, friends, and the neighbours of a lifetime (often in distant parts of the country whither I went to interrogate them) at the moment of discovery, when from shock, personal fears, and general interest it seemed probable that every known fact or suspicion would be revealed consciously or unconsciously to a watchful inquirer. And the patients referred to, though repeatedly interrogated while under detention, have never seriously varied the information thus gathered at first."

At a further part of his essay he thus sums up his experience. The statement follows a most careful examination of the facts recorded by others as to experimental inoculations.

"I conclude, then, that the theory of the inoculability of leprosy in its morbid products will not hold water; and that it fails for want of evidence, experimental or clinical, sufficient even to raise a presumption. But then, the fact that leprosy can be acquired by persons who have never been in conscious contact with any leper becomes of the greatest importance with reference to the question of the true provenance of the virus.

"The interpretation which this limited but carefully recorded experience best bears is now left to the reader's judgment. I disclaim the position of advocate; but I may well express my opinion, which is, that in New South Wales close contact with tuberous lepers is a matter of very slight moment, and that little contact or no contact at all does not avoid danger."

At another place he writes :—

"Proof of the manner in which leprosy is diffused remains wanting: but whereas acknowledged facts which are inconsistent with the notion that the virus is derived from the bodies of existent lepers, and that the disease is maintained by direct or indirect communication with the sick, are met with at every turn by those who entertain that view, nothing is certainly known which runs counter to the hypothesis that the virus resides, not in man, but in his surroundings."

Amongst the more important data upon which his opinions were based I may quote the following concerning the Victoria Colony :—

"In 1874 the Board, after referring to the interpellation in the Legislative Assembly mentioned above, gave the result of an investigation made by the Chief Commissioner of Police on October 16th, 1873, as follows :—

"'The total number of lepers in the colony on the date mentioned was fifteen, who were thus distributed :—Four at Ballarat, three at the Woolsheds (near Beechworth), one at Buckland (in the same neighbourhood), one at Wood's Point, one on the Wimmera River (in the neighbourhood of Horsham), one at White Hills (near Bendigo), two at Melbourne, one at Castlemaine, and one whose residence was then unknown.'

"Whence it is clear that there had not been (and there never was) a general collection of lepers at Ballarat. The report under notice went on to condemn the 'ignorant fear' of contagiousness, 'which has condemned nearly all the sufferers from the disease in this colony to a cruel isolation, and, in some cases, inhuman neglect,' and again recommended admission of lepers to the various benevolent asylums. This was supported by the following statement:—'The history of the disease in this colony has certainly not afforded any ground for apprehending its spread by contagion, no instance of the kind ever having occurred here, although in one town, Castlemaine, lepers have for the last ten years been admitted to the public hospital.'"

Respecting Castlemaine we have the following in addition:—

"During 1859 there were four lepers under treatment. Because of the small number of beds the hospital then afforded, they were lodged in a tent erected in the grounds, about twenty yards from the accident ward; and sometimes there were six Chinese in the tent, for those who were ill in other ways did not object to occupy it with the lepers. Outside the hospital the lepers were avoided by their countrymen, but simply from inhumanity. At about the same time there were also three other lepers under outdoor treatment. It would seem that the in-patients were usefully employed about the hospital, for Mr. Otley mentioned one whose fingers, toes, and nose had almost disappeared, who used to pump water from an underground tank for general use."

The following is quoted from a return made by Dr. McCrea (see Thompson's Essay, p. 121):—

"Persons affected with leprosy are in this colony allowed to communicate freely with the rest of the community. They are, however, generally deserted by the other Chinese; it would seem rather from hopelessness of cure than from any fear of contagion, though they give their dread of contagion as an excuse for their inhumanity in deserting their brethren. There are no separate asylums or infirmaries for leprous patients, but they are admitted into the general hospitals. . . . There has been no instance of recovery."

CHAPTER XXXV.

ON RECOVERIES FROM LEPROSY.

Before recording my own experience and the observations of others as to recoveries from leprosy, it is almost essential to give some definition of what is meant by "recovery." The word "cure" may, I think, be for the present, at least, suitably abandoned, for it implies more than we as yet are justified in doing as to the efficacy of remedies. It may be that the future will disclose some drug or some serum, the influence of which upon leprosy will be proved to be so definite that it may be credited as a means of cure. For the present, however, it is to be admitted that we know of none such. The so-called recoveries have taken place under such various methods of treatment that it is only fair to conclude that they must have been, in large degree, spontaneous and due to the natural powers of the organism in reference to the parasite. For our present purpose, it may be well to apply the term "recovery" to cases in which all activity of the leprosic processes appears to have permanently come to an end. Permanency may be assumed if, during a period of five years or more, the cessation of activity has been absolute and the reparations steadily progressive. It is, of course, by no means implied that the patient is restored to his former state of health. The fingers or toes which he has lost do not grow again, his paralysed nerves do not again resume their perfect functions, nor is he, it may be, wholly exempt from certain inconveniences which attend their loss. Nor need we dispute as to whether or not some lepra-bacilli may still retain their parasitic life. It will be sufficient that through a long period of years they exhibit no tendency to activity, and that the patient appears to be well. Using the word "recovery" in this sense, my conviction is that in many countries recoveries from leprosy are common, and, further, that, unless the circumstances are exceptionally unfavourable, when such recoveries have occurred, they are permanent, and wholly without risk of relapse. The exceptionally unfavourable circumstances to which I refer are extreme poverty, or what is probably of far greater importance, a return to the use of fish-food of the same character as that under which the disease originated.

The present work deals with the causation of leprosy and its social aspects, and it would be out of place to enter in any detail on the question of its treatment by drugs or other means. These matters are more suited for a medical treatise. It is necessary, however, in order to complete the picture which I have endeavoured to draw that a few words should be said as to the general results which have been obtained. Some of these throw important light on my attempted explanation as to its cause.

The popular belief as to leprosy is that it is absolutely incurable, and always advances with sure course to death. That this is not the fact I have already explained in more than one of the preceding chapters. That recoveries do occur is well acknowledged by all who have had opportunities for observation, although very varying estimates have been formed as to their frequency* and degree of completeness. In all countries and almost in all times there have been those who professed to cure leprosy, and specifics innumerable have been put forward, many of which have secured a temporary reputation. I dare not place confidence in the fact that much of the Levitical law concerning leprosy is devoted to the details of thanksgiving for cure, since the diagnosis in those early ages was much in doubt. We may, however, safely assume from the fact that many modern observers of undoubted honesty have claimed to have effected "cures" that instances of noteworthy restoration to health have not unfrequently occurred. Further than this, we may also venture to believe (since these alleged recoveries have occurred under the most varied methods of treatment) that there is in the disease itself a tendency to spontaneous arrest. This probability I have made part of the definition of the disease given at p. 21. It is, we may believe with much confidence, a character of all diseases which, like leprosy, depend upon the activity of a specific parasite diffused through the tissues of the body that they should decline after a certain duration if only the patient's life can be prolonged. Such is unquestionably the case with those maladies which depend upon the presence of the tubercle bacillus. Long before the modern methods of treatment of consumption became fashionable it was well recognised, both by the profession and the public, that patients suffering from that malady even in advanced forms did occasionally recover, whilst pathological investigations made it certain that from the early stages convalescence and restoration to apparently sound health were quite ordinary events. Respecting all the contagious fevers, we know that they are transitory. It is probable that the facts as regards tuberculosis and leprosy are in this matter much alike. The bacillus may be present in both for quite indefinite periods of time without manifesting activity, and it may, after having exhibited vigour, again lapse into quiescence and leave its victim apparently well. If, however, my contention be accepted that the influence which stimulates the bacillus of leprosy to activity is the use of fish as food, the two diseases named at once part company, for we know of no single article of food which exercises any parallel power in the case of tuberculosis. It may, however, easily be the fact that tuberculous milk or meat may have that effect. It is in connection with what has just been suggested that we are to seek the explanation of the great difference of opinion as to the possibility of recovery from leprosy and the risk of relapses. Although it is certain that the disease cannot be initiated by the use of sound fish, yet it by no means follows that when once established it may not be influenced injuriously by all kinds of fish. The observation has been made independently by the superintendents of many leper homes that rations of fresh fish were apt to make their patients worse, and in many countries a popular conviction of the same fact has led to abstinence from fish as an article of food. In other countries, however, and especially in those in which fish is very abundant and an essential element in daily food, this observation has escaped attention, with the result that no degree of abstention has followed. It is obvious that under such conditions drugs could have no fair chance, and that recoveries would be very improbable. It may be taken for granted that in most modern leper-houses the food supplied to the inmates is more select than that which they would otherwise obtain, and that thus far they have some increased chance of recovery. It is, however, certain that in many, perhaps in most, fish is by no means excluded, and in some, as for instance in those of Norway, it may constitute a very important article. On Robben Island also, fish, which was I believe at one time excluded, has of late been regularly supplied, and this, too, notwithstanding an opinion recorded by one of the medical superintendents that it, in many of the patients, caused distinct aggravation of the symptoms. I will by no means suggest that the lamentably heavy mortality which the annals of the latter establishment disclose is to any large extent due to the non-prohibition of fish. My belief is that the fearful mortality which occurs there is very largely due to the utter despondency and consequent depression of vital energy which is induced by the sentence of life-long imprisonment. Dr. Impey has shown us by statistics that a very large proportion of those brought to this desolate island die within two years of their arrival. The famous line from Dante respecting the abandonment of all hope might well be inscribed on the landing pier, and if the death certificates were truthfully filled up I doubt not that "a broken heart" would almost invariably figure as an active contributory cause. It is as I have said not necessary to invoke the use of fish as à cause of the ill results on Robben Island, and very probably the consumption of fish is by no means large. In Norway it is different. The segregation there is, for the most part, quite voluntary, and the isolation is not severe. A large proportion of the patients would probably, if permitted, not be eager to return to their homes, but here the consumption of fish is large. The charge against the Bergen Hospital is not so much that life is shortened as that recoveries are few. No doubt as regards food an inmate of the Lundegaards Hospital is in far better position than a fisherman-peasant at his home. He will get more flesh meat and less fish, and all the fish which he gets will be in good condition.

---

* So recently as 1903 Professor Pontoppidan, of Copenhagen has written respecting leprosy: "In fact it presents the most dismal and hopeless image of an incurable and deadly disease; perhaps the worst which can befall man."

This supposition cannot be extended to the leper-houses of the Middle Ages, some of which were, it is to be feared, very badly supplied. Respecting one Scotch Burg it is on record that an order was made to send all articles which had become tainted, whether flesh or fish, to the lepers. Yet from no authorities do we get such desponding statements as to the possibility of recovery as from the Norwegian physicians. The whole chapter on treatment in the excellent little treatise of Hansen and Looft is written in a tone of hardly concealed sarcasm, and these distinguished observers almost openly avow their want of belief, not only in all drugs, but in the possibility of recovery. It is true that in former times Dr. Danielssen held a more hopeful creed, and considered that he had discharged as cured a certain number of his patients. His successors have, however, I believe, discredited his results, and have asserted that most of those supposed to have been "cured" subsequently relapsed. That the number which had been so claimed was not large may be inferred from a statement which I quote from Dr. Thin's treatise to the effect that according to a statistical report published in 1882 there had occurred during a period of twenty-five years 107 cases of "cure" and 4,891 deaths. This gives a ratio of not much better than one recovery to every fifty deaths.

It is to be freely admitted that in the compilation of statistical statements such as that just quoted there is room for very serious fallacies. So much will depend upon the sense in which the term "cure" or "recovery" is applied, and upon the more or less sanguine temperament and scrupulosity of the recorder. The figures quoted must not be allowed to imply anything further than simply that cases which could fairly be counted as recoveries from leprosy have been very infrequent in the experience of Norwegian observers, and this is a conclusion which I believe not only fully coincides with the general impressions of these observers themselves, but also with those of their foreign visitors. Leprosy in Norway would appear to be of an exceptionally severe type. The ratio of tubercular cases to others is greater than in most other countries. The number of those who become blind from leprous affections of the eyes is excessive, and the number of "recoveries" is very small. When recovery is supposed to have taken place, there is still risk of relapse if the patient returns home. It is impossible to record these impressions as to the severity and incurability of leprosy in Norway without being reminded that those districts which supply lepers are the homes of fishermen, and that a diet of badly cured fish precedes the onset of the disease, and is usually persisted in throughout its course.*

I would venture to urge that abstinence from fish, whether sound or otherwise, is a measure of primary importance in the treatment of leprosy. If this opinion be well grounded, it will follow that in countries like Norway and Iceland, where the supply is unlimited, and where the patients are allowed to continue the unrestricted consumption not only of sound fish, but of the very article to which the disease is attributed, recoveries are not to be expected. This remark applies to all cases, wherever occurring, in which the patient remains in the place where the disease originated, and makes no change in his habits. In some, however, it is of much less force than in others. Thus, in Ceylon and many large districts in India the supply is small and the prevalence of disease in accordance. In these the patient, whether remaining at his home or transferred to an asylum, is not likely to get much fish, and his chances of recovery will be correspondingly improved. Still better may be the circumstances of a leper who leaves the place where the disease was contracted and goes to live elsewhere. Those who leave leprosy districts and come to reside in Europe exempt themselves, at any rate, from any risk of feeding their disease by the use of bad fish, for, unless under very exceptional conditions, it is not to be obtained. For long there has been a widely prevalent opinion that such ought never to return to their former residences, and that the prospect of recovery would be much diminished if they did so. No explanation of this could formerly be given, for it has been admitted on all hands that climate has nothing to do with the malady. The suggestion now offered is that when a leper returns to his former home, his danger lies in a return to his former dietetic habits. There has been, I believe, all over Western Europe, and especially, perhaps, in England, a very considerable degree of hopefulness felt as regards a leper's prospects, provided the change of country be maintained. From Paris, Hamburg, London, and other places we have from time to time had reports of cases in which recovery had taken place.

---

* It gives me great pleasure to record the belief that these observations refer to conditions which are rapidly undergoing amelioration.

We may here note that under certain changes of residence abstinence from all kinds of fish results of necessity. This is the case with the Kaffirs of Natal. They go over to the mines and there eat fish, but on returning to their kraals on the other side of the Drakenberg they get none. An abstinence probably as complete is usually the result of the migration of Norwegian lepers to the Western States of North America, and possibly of removal of Colombian lepers to the leprosy mountain-town of Agna Dios. It is recorded of the last-named place that it has repute for its cures. Although I do not know that any facts as to definite recoveries have been recorded from North America, it appears to be highly probable that the disease there runs a very mild course, and tends to die out spontaneously. As to Natal, I may say from personal observation that cases of spontaneous recovery are not uncommon. I saw more than a few patients in which all symptoms of the disease had ceased, and in whom the recovery had been tested by many years of good health. For long in my own London practice I have been in the habit of insisting in all cases on entire abstinence from fish.

It would not be suitable that I should on the present occasion enter into any detail as to cases which have during the last forty years come under my own treatment whether in hospital or private. Inasmuch, however, as I make no claim whatever for special skill, having relied almost exclusively upon the simple recommendations of a liberal diet and absolute abstinence from fish, I may venture to record my impressions in general terms. Were I to trust to those impressions, I should speak of the treatment of leprosy very hopefully. Very few of the cases with which I have been made acquainted in England have ended in death. Concerning some which were only temporarily under my observation I cannot speak with certainty, but of those in which the final result is known, only five or six are dead. In one of the fatal cases, a young man who was apparently recovering from his leprosy, and who was in regular employment as a clerk, died after a short illness of tuberculosis affecting the brain. A very considerable majority have made good recoveries, so far as recovery is possible, and have stood the test of many years by remaining without relapse. In no single case have I ever witnessed anything which could fairly be called a relapse after an apparent recovery. Not a few of the patients whom I count as recoveries did not come under my observation until a late stage, when the improvement was already well advanced, and the number of those in which I have traced the malady from an early stage and onwards, through one of severity to recovery, has not been large. In 1878 I brought before the Medico-Chirurgical Society one such. In that instance I had seen the patient, a Jewess from the West Indies, during a most severe condition of tuberculous leprosy, and I knew her to be in excellent health and quite free from symptoms for ten years after her recovery. She herself attributed her cure to the use of port wine which one of her sons had provided for her. In another case, a colonel in the Indian Army, blind from leprosy, and with crippled hands, lived, to my knowledge, for fifteen years after his recovery in excellent general health, and finally died of apoplexy. In a third, the patient, formerly a soldier in India, has been under observation fifteen years, during the last twelve of which, excepting for loss of sensation in his hands and feet, he has been quite well. A fourth case is that of a lad whom I often produce for demonstration at the Polyclinic, and who at one time presented the most characteristic tubercular physiognomy. He has now been under my observation for more than five years. He has grown well, and it seems probable that he will recover without any obvious blemish. This last is the only one of my series in which I am inclined to credit any drug with a definite share in the result. In this lad, after trial of mercury and arsenic without any good effect, the improvement was marked when chaulmoogra oil was substituted. This drug was the only one which my inquiries at the leper-asylums in South Africa and India led me to regard with favour. Those in charge of these establishments who gave this oil a fair trial almost invariably spoke well of it. In my other cases, various drugs had, of course, been tried, and for a time I was inclined to think well now of one and now of another. All had taken at times quinine and nux vomica, and many had had long courses of arsenic in small doses. My conclusion has been, however, that the essentials in the treatment of leprosy are a liberal diet, with a little beer or wine at meals, and entire abstinence from fish. Meanwhile, the patient may take any tonic that suits, and as much chaulmoogra oil as he can digest.

CHAPTER XXXVI.

ISOLATION INEFFECTUAL IN THE MIDDLE AGES.

In an address at a recent Tuberculosis Congress, Professor Koch is reported to have encouraged his audience to hope for the extinction of that malady by appealing to what had been effected in the case of leprosy through measures for the prevention of contagion.

All who are acquainted with the facts as to the disappearance of leprosy from the greater part of Europe, will regret much to see an authority such as Professor Koch thus reaffirm the often confuted fallacy that it was brought about by segregation measures. If those who hope for the extermination of tuberculosis by preventing its spread by contagion have no firmer ground than this, they are indeed building upon sand. The iteration of such a fallacy is conceivable only in a partisan, willing to avail himself of anything which may seem to give support to his theory, or of one who has never studied the facts and bases his assertions on mere hearsay.

I will endeavour to state the facts clearly, and in doing so must invite my readers to make legitimate use of their imaginations and try to picture for themselves the social conditions of the times with which we are concerned. Leprosy was then prevalent over the whole of the continent of Europe and all its adjacent islands. The islands, perhaps, suffered more than the mainland, but this disease probably occurred more or less almost everywhere, and nowhere was it reputed to be specially endemic. Its almost universal prevalence would denote that, if its only means of spreading was by contagion, then it must have been very contagious. It was not a disease of the poor only, for ladies, priests, nobles, even occasionally kings, were its victims. Yet, though so widely spread, only a very small minority suffered. We have no information as to its origin, but probably it had prevailed from time immemorial, and scarcely any traditions exist as to its introduction into special localities. It culminated, probably, about the time of the twelfth or thirteenth centuries, or at any rate, more attention was given to it about that time. A legend has been invented that the return of the Crusaders from Palestine was influential in its spreading, but this was probably based upon the circumstance of its being a Biblical malady, and therefore likely to come from Bible lands. It is quite certain that leprosy was present in Europe long before the Crusades, and it is not very probable that many of the returning soldiers found their way to Iceland, the Faroes, or the inhospitable coasts of Norway. To think that they were the means of its dissemination, on any large scale, is to suppose that the disease is virulently contagious, which most certainly it is not. Then, as now, leprosy was a chronic malady lasting through many years. Then, as now, it was an insidious disease, the early stages of which were difficult of recognition. Then, as now, its diagnosis, even in the later stages, was very liable to error, and cases of psoriasis, leucodermia, lupus, &c., might easily be confused with it. It is unquestionable that about the time referred to, and later, many benevolent persons, under the influence of the Christian doctrine which was then at its height, were moved to found homes for lepers, as well as for other sick and indigent persons. Leper-homes became common. To those for whom a *post hoc* is sufficient it may certainly be granted that the multiplication of leprosaria and the decline of leprosy appear to have been coincident. Other facts have, however, to be taken into consideration before we jump to the conclusion that this result was due to the prevention of contagion, or in any way consequent on isolation.

I have now reached a point at which I must again ask my readers to think with candour, and to use their best endeavours to form a clear mental picture of the actual facts. They must keep in mind that the alleged contagion of leprosy, if a reality, must be at once very insidious and under some conditions very potent. An exceedingly slight exposure to risk must often suffice to convey it, and apparently no predisposing conditions are requisite in the recipient. If, therefore, such a disease is to be trodden out by isolation measures, such measures must be complete and continuous. Now it is quite certain that the leper-homes of the Middle Ages did not attain anything approaching to complete segregation. More than that, it is quite certain that they did not attempt it. They were refuges into which it was a privilege for the patients to obtain admittance, not places of detention into which they were compelled to go. The popular imagination is occupied by stories, in prose and poetry, of the outcast leper and of the fearful ceremonies by which he was compelled to renounce the world and pledge himself to seek no intercourse with his fellows. That such ceremonies may have been used occasionally, and in some districts, we need not doubt, nor that in almost all countries a leper in an advanced stage of disfigurement was usually shunned and regarded with loathing; but in every country where leprosy has prevailed, the instincts of human nature have in the main triumphed over both disgust and fear, and family affection, the desire of gain, and the love of an idle life, have each in turn induced healthy persons to associate without precaution with the sick. The proof of these statements is to be found in every page of the records of mediæval lazar-houses. In that of Troyes healthy women were employed as nurses, and it is on record that at a visitation in 1575 three of these were found to be pregnant, and in the case of one of them it was for the second time during her residence of ten years. The same woman was accused of having brought prostitutes into the home. A male leper of the same home who was convicted of immorality at a public house was flogged and banished for five years. At many leper-homes the punishment for breaches of discipline was simply expulsion, and the delinquent was sent to wander through the country. There would seem, indeed, to have been but little concern as to the safety of the peasant population. The leper-homes were for the towns, and in many cases only those who could prove their parish settlement had any claim to be admitted. At Paris, with an unimportant exception, no one could be admitted into St. Lazare unless he was the legitimate offspring of citizens and born within the four gates of the city. At Nismes a stranger had to obtain the approbation of the Council and pay a sum down. Indeed, at most lazar-houses some payment was required, and the poor were at a disadvantage. So strictly were parochial qualifications demanded that it is on record that a Duke of Burgundy failed to obtain from the authorities at Lisle admission for the servant of one of his friends.

In the year 1508, John, King of Denmark, ordered, respecting the leper-house of St. George, at Copenhagen, that the alms collected "be distributed to all the inmates of the hospital, in such a manner that the sick receive more than the healthy inmates." It is presumable from this that there were in the hospital not only lepers and other sick persons, but a certain number of poor who were not counted as sick.

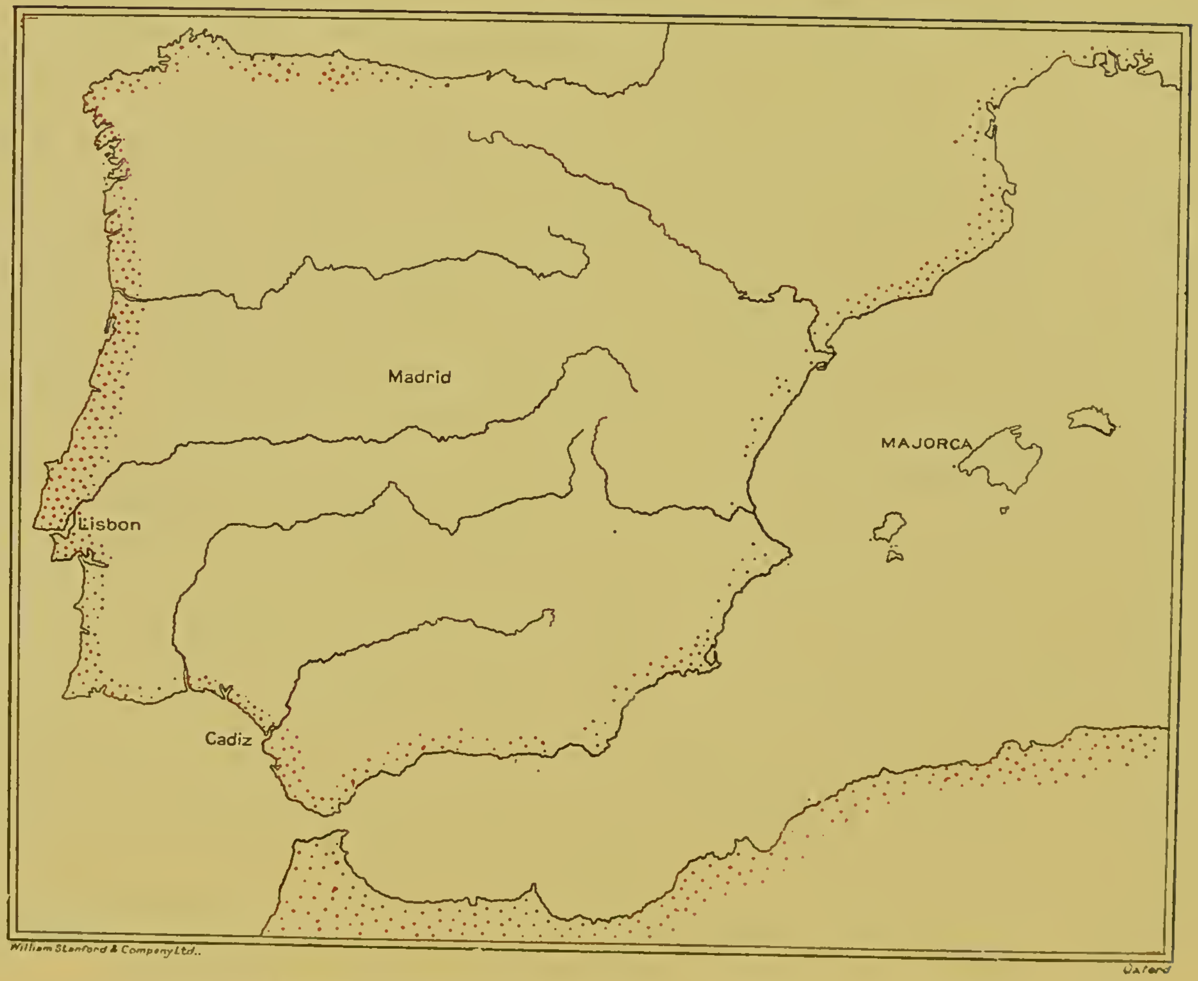
The same King John of Denmark, having had complaints made to him as to the ill-management of a leper-house at

Naevsted, gave order that the rector of the parish, and after him his successors, "shall employ women to nurse the sick, who shall watch over them and take charge of their food, clothing and washing, and hold themselves entirely at their service." Not a hint is given as to any risk run by these nurses; nothing is apparently thought of but the comfort of the patients. In the same edict we read: "From this day forward no new healthy brother shall be admitted to the convent, but all the sick brothers who come from the district paying tribute to the convent must be received into it." Clearly admission was a matter of charity and favour, and by no means of compulsion.

Respecting the hospital at Svendborg under date 1436, we find the following: "The income shall be divided equally among the sick brothers and sisters and the eight healthy brothers and sisters, these latter being charged with the care and maintenance of the sick." We infer from this that the number of patients was usually about the same as that of their attendants. It is one of the exceedingly few instances in which women lepers are mentioned. In the case of another hospital in which the numbers of the sick and healthy are given, they were just equal. At this same hospital it is clear that both the attendants and the patients had their wives with them. One of the enactments ordains: "If any of the eight healthy brothers loses his wife, he must never marry again . . . . but will be expected to remain chaste as beseems a monk." Further: "The sick may not marry again if his consort dies, unless some one consents to share his fate." Thus it is clear that the remarriage of a leper was not thought wrong, nor the admission of his healthy bride into a leper's home.

It is to be kept in mind that the decline of leprosy in Europe was general, universal, and almost simultaneous. There were significant exceptions to these statements, but

PLATE XIII.



MAP OF SPAIN, ETC., SHOWING DISTRIBUTION OF LEPROSY AT THE PRESENT TIME.

[*To face page* 285.

for the most part they are true. Nor after the decline had set in was there any relapse. Leprosy did not linger here and there, in out-of-the-way and neglected places, but it vanished by a sort of slow melting away from all. In the course of a few centuries, France, Germany, Sweden, Denmark, the British Isles, including Ireland, the Orkneys, and the Shetlands—were free. They were almost absolutely free, hardly a case remained, and they have continued free ever since. Although into most of these countries numerous cases of leprosy have since been imported, and, for the most part, no precautions observed, the disease has never shown any tendency to again become endemic. Its decline was apparently much hastened by the Reformation, and the final closing of the leper-houses was delayed a century or more in those countries which still adhered to the old faith; in some of them, Spain, Portugal, and Italy, for example, it lingers yet.

I venture to insist that it is absurd to imagine that in the Middle Ages there existed anywhere a medical police of sufficient skill and sagacity to effect the isolation of lepers. The absurdity of such a supposition is increased a thousandfold if we realise that these impossible conditions must have been existent, not only in a few populous cities, but systematically arranged over the whole country. Leprosy was not concentrated anywhere, but was met with sparingly over the length and breadth of the land.

There is plenty of evidence to show that when leprosy was declining, the attempts at isolation, such as they had been, wholly ceased. In proportion as the victims diminished in numbers, so, naturally, would the fear of it decrease, and we may safely believe that in almost all instances the last leper of the district was allowed to recover at home or to die quietly amidst his family. If he had preferred to seek the hospitality of a leper-home he would usually find himself by no means solitary. With him there would be those sick of other chronic maladies and some who were merely indigent. It is on record that at one leper asylum, when the number of legitimate applicants fell off, blind persons were admitted to occupy the beds. When a leper died in a home his clothing, bed, and all his belongings became the property of the community which had sheltered him, and we do not meet with any hint that such articles were destroyed; on the contrary, they appear to have been thought a valuable perquisite.

Had there been no other influence at work in effecting the extinction of leprosy than the prevention of contagion by systematic seclusion of lepers, it is impossible that the decline should have been general. However zealous some districts might possibly have been, others would have been supine, and thus foci of disease would have been maintained.

In all seriousness I again ask, is it conceivable that in all these countries, distant from each other and diverse in customs, any measures of isolation could have brought about the simultaneous and uninterrupted decline of such a disease as leprosy? Does it not amount to a certainty that some unsuspected influence was at work alike in all countries, which was slowly but surely putting an end to the still unrecognised cause of the malady? Do not the facts point irresistibly to the conclusion that that influence must have concerned the food of these various peoples?

Finally, let it be noted that, as regards the provision of homes for lepers, the places in which the disease has lingered were not at all behind those from which it has disappeared. Bergen has one of the oldest and certainly what was formerly the largest leper-home in the world, yet the disease still prevails in Norway. Spain and Italy had their leper-houses and they still have lepers. Of Crete, in which lepers still abound, Dr. Ehlers (to whom I have been indebted for several of the facts which I have quoted) has just written, " de temps immémorial il est de coutume en Crète d'isoler les lepreux." It is, of course, true that in these places the isolation has never been complete; but neither had it ever been one whit more nearly complete in any of the places from which the disease has vanished.

CHAPTER XXXVII.

THE LEPER-HOUSES OF THE MIDDLE AGES.

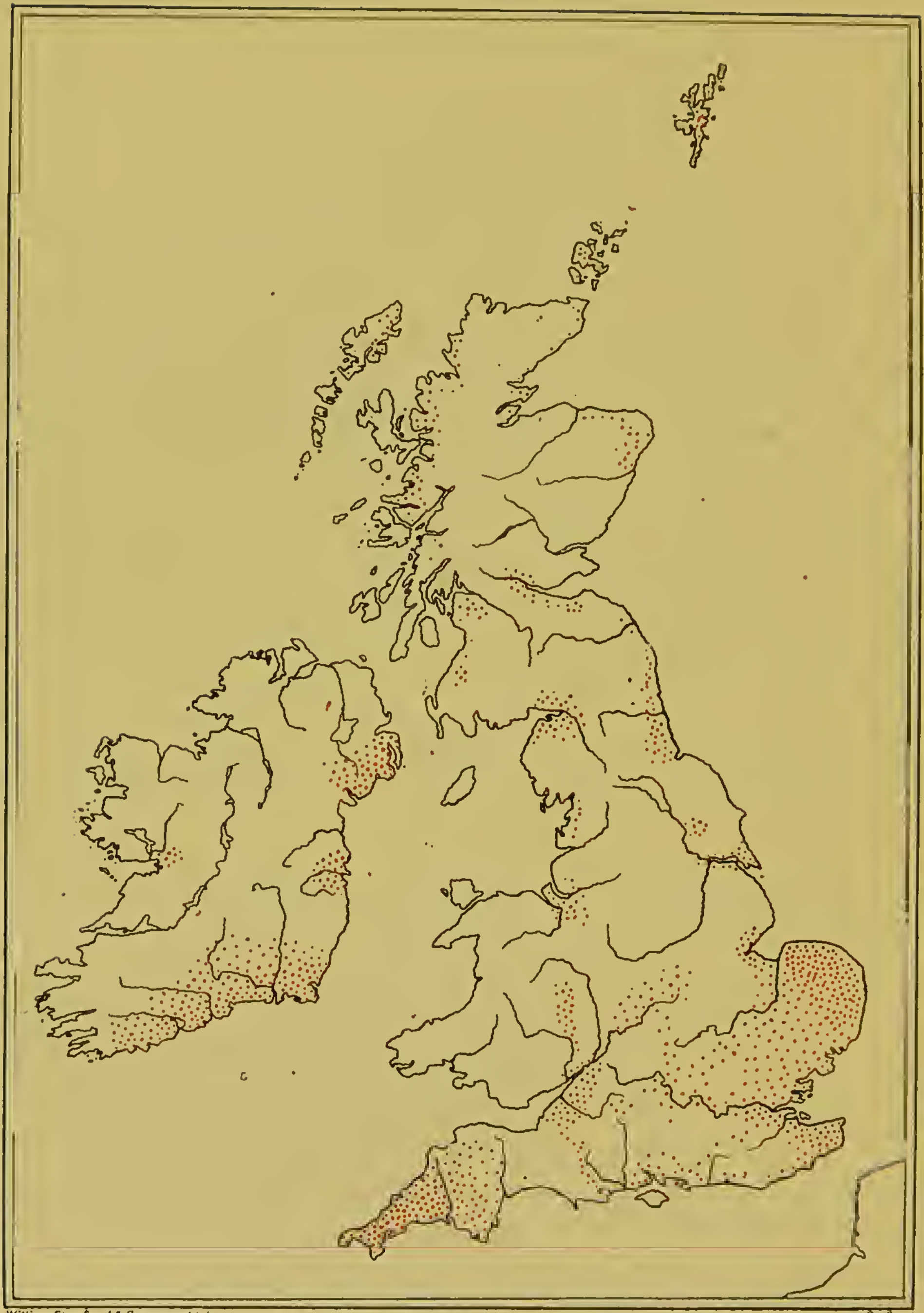
It has been thoughtlessly asserted a thousand times that the Crusades brought leprosy into Europe, and that compulsory seclusion in leper-houses exterminated it. No two assertions could be more distant from the truth; yet, without further thought they will, I doubt not, be repeated a thousand times more.* I have already in previous chapters given reasons for my own belief on these points, and purpose to devote the present one not so much to argument as to the citation of facts and opinions recorded by others. The reader will kindly bear in mind that the following quotations have been selected as bearing upon several more

---

* Whilst I write, one of the next thousand comes to hand. A pamphlet just published by Professor Eric Pantoppidan, of Copenhagen, has reached me, in which the following occurs: "Leprosy is now extinct in Denmark, *thanks to the energy of our forefathers.*" The italics are mine. The professor has apparently no misgivings.

Too much thought, if attended by neglect of reading history, may, it would seem, lead to equally erroneous conclusions.

In a work recently published by Professor Jacobi, of Freiburg, with an "adaptation of the text" by a London physician, a somewhat extraordinary inversion alike of the facts and of the popular belief occurs. We there read as follows: "Leprosy is a general infective disease known even in very ancient times as a contagious malady, which was very widely distributed till the Middle Ages. At the time of the Crusades, however, it was forced into the background by the advance and extension of syphilis, and now its occurrence is extraordinarily diminished, so that it exists with frequency in the tropics only, and is scattered sporadically over Europe (Norway, Russia, Greece, with a small area near Memel)." The phraseology of these statements is unfortunate, unless indeed egregious misprints have occurred. It was precisely during the Middle



William Stanford & Company Ltd., Oxford

DISTRIBUTION OF LEPROSY IN THE BRITISH ISLES DURING THE MIDDLE AGES. (Copied from Dr. Newman's Prize Essay.)

[*To face page* 289.

or less distinct aspects of the question. In the first place, to show the antiquity of leprosy in Europe; secondly, its local prevalence; thirdly, measures adopted for the care of lepers and the true nature of the leper-house; and lastly, the social conditions of the time as bearing upon the probable causation of the disease by fish-food. I must apologise for presenting these extracts in such a disjointed arrangement; but the space at my disposal does not permit of my attempting anything of the nature of consecutive history. The reader who wishes for more detailed information may be referred to Sir James Simpson's papers, Dr. Creighton's writings, and the admirable summary given by Dr. George Newman in his prize essay on the "Decline &c. of Leprosy in the British Islands." From all these, but especially the last, I shall quote freely. It is due to myself however to state that I had, long previous to the publication of the two last, advanced the same opinions and adduced not a few of the same facts.

Early Leper-houses in England.

Dr. Newman * writes:—

"The first return of any Crusaders cannot have been before 1098, for they only left in 1095; yet there were at least three famous leper-houses before that date—Canterbury, Northampton, and Chatham—and Hugh, Bishop of London, and other noteworthy people of the time, had died of leprosy. (Besides earlier records of the disease, for which see the chronology in the Appendix.)

Ages that leprosy was most widely distributed. The disease was certainly not forced into the background at the time of the Crusades, for it was believed to have been greatly augmented by them; nor by any possibility could the advent of syphilis have so forced it, since this advent did not occur until the fifteenth century, two hundred years and more after the last Crusade. Nor is it correct to say that leprosy is now scattered sporadically over Europe, for it occurs almost solely on the coast and is quite unknown in the interior.

* Newman's prize essay.

"From the establishment of the leper-house at Canterbury, before 1089, up till the end of the fifteenth century, British history has many like establishments to record.

"The disease was present in Scotland from the time of Stephen till the commencement of the seventeenth century, and in Ireland from the fifth to the eighteenth.

"With these preliminary remarks, I will take some of the chief leper-houses, and outline something of their history.

"The first of which we have much record is Canterbury. Somner states that leprosy became 'a national malady, and accordingly in all parts provision was made for the receipt and relief of the infected persons.' 'There are,' he says, 'three houses at Canterbury—St. James's, St. Laurence's, and Herbal.' Other historians give St. James's, St. Nicholas', and St. Laurence's, and others only two. There can be no doubt that Lanfranc, then Archbishop of Canterbury, founded a hospital here before 1089. Northampton and Chatham were established very shortly thereafter, both in the eleventh century and probably both in the reign of William II. The latter was founded in 1078, on the south side of what is now the High Street, by the celebrated Bishop Gundulph, for the reception of lepers of both sexes. The endowments were small, and though they were afterwards augmented by different benefactors, the proceeds were seldom sufficient to support the inmates, who were hence accustomed to be supplied with provisions from the Priory at Rochester. These lepers seem to have lived a corporate life, and were possessed of a common seal. A chapel was built for them in the reign of Henry I. (1100—1135), St. Bartholomew's, which was increased by Henry III, Edward I, and Edward III, and underwent various royal additions up till Edward IV.

"Remegius, Bishop of London, was the first builder of the house at Lincoln. It was primarily intended for ten lepers, who were to be outcasts and slaves (*villani, servi*) of Lincoln. In the space of two hundred years from its foundation the character of its inmates had changed, for Edward III's commissioners found nine poor brethren and sisters in it, *only one of whom was a leper*. In 1457 it was, by order of Henry VI, annexed to the large and famous leper-house at Burton, in order, as it was stated in the charter, 'for the better maintenance of three of the king's servants that should happen to be lepers, either at Lincoln or in the hospital of St. Giles, near London.' Provision was also made for the possibility of other lepers requiring its shelter. One hundred and fifty years after the establishment of the Holy Innocents, Lincoln had another leper-house (1280). 'The place where the leper-house stood,' says Cookson, 'is now called the Malandry Closes, and stands on the Lincoln and Sleaford turnpike just outside Little Bargate, the ancient south entrance to the city. "Malandry" is a corruption of *maladerie.*'

"York and London had hospitals almost simultaneously with the first foundation at Lincoln.

"There was near the city of York a lepers' hospital during the time of Maud the empress."

The Distribution of Leprosy in England.

Leprosy was by no means scattered evenly over the country. Although it occurred more or less everywhere, it had very definitely its favourite seats. On this point Dr. Newman writes:

"It will be noticeable from the accompanying list that the leper houses—not necessarily the leprosy, but probably—were more frequent in some parts of England than others. The western counties were comparatively free in comparison with the eastern, and of the latter Norfolk, with its capital Norwich, affords a striking example of the numerous lazarettos. Norwich itself boasted of six different hospitals."

I give in this connection a copy of the map which accompanied Dr. Newman's essay. It may be admitted that the data for estimating local prevalence are imperfect. There is, however, no reason to doubt the general accuracy of the conclusions.

"The earliest date that we have any knowledge of leprosy being 'brought to England' was in the year 60 B.C. It existed in Egypt in the reign of Husapti at least three thousand years before Christ, it was common in India and China four hundred years before Christ, and was known in Spain, Italy, and England about sixty or more years before Christ. These are only approximate dates: it probably occurred much earlier. 600 A.D. witnessed an increase in leprosy in the British Islands, and about the same date it is recorded of the Glasgow saint, Kentigern, that *mundabat leprosos.* Sir James Simpson states that the Blythe Leper Hospital at Nottingham was established in 625 A.D., other authorities think it was 638, and the majority believe the first English leper-house did not exist until the eleventh century. It is, however, almost certain that leper-houses existed in Ireland as early as 869, and leprosy was certainly prevalent at the beginning of the tenth century.

Hywell Dda (a Welsh king and famous law giver, who died about 950) enacted several laws relative to leprosy. 'That a married female was entitled to separation and the restitution of her goods and property provided her husband was affected with leprosy' (Celtic General Repository, vol. iii., p. 199). It was about this time that a law was instituted in England causing leprosy to be a valid cause for divorce.

"It was in the eleventh century that the first 'hospitals' and pest-houses were built; but we must not necessarily assume that the existence and building of leper-houses and like institutions implied a new or even an increasing disease. The leper-house period—roughly from the eleventh to the fourteenth centuries inclusive—may have been due to the awakening of humanitarian ideas, or to some rough medical or ecclesiastical intention of thereby preventing the spread of the disease. In all probability leprosy was at its zenith not later than the twelfth century, even though many leper-houses date after that. Whether that be the exact period of its zenith, it seems quite clear that leprosy was a pre-Norman disease in the British Islands."

WALES.

In Wales, up to the time of the Reformation, the fish fast days were observed. It is probable that there were under the name of Clafdai a certain number of leper retreats. My friend, the late Dr. Evans, of Llanerchymedd, kindly interested himself with the assistance of Professor Rhys, of Oxford, in obtaining what information could be had. Nothing definite can be ascertained, but we may assume that leprosy was fairly common, and that it died out under the same conditions which witnessed its extinction in England.

In 1236, Gilbert Marshall, Earl of Pembroke devised the Mandlin meadows (eleven acres) for the relief of the Tenby lepers.

Lepers' windows are said to be common in the churches of the Principality.

IRELAND.

"Belcher believes leprosy was prevalent in Ireland in A.D. 432, and from that date it existed more or less (endemically) till 1775, when

Waterford Hospital had its last case. A hundred years after its 'first notice' it seems that there was (what was termed) a pestilence of leprosy (550). 'The rickets are of late very rife in Ireland,' said Dr. Boate in 1652, 'where a few years ago unknown: so on the contrary it hath been almost quite freed from another disease, one of the very worst and miserablest in the world, viz., the leprosie, which in former times was very common there, especially in the province of Munster: the which, therefore, was fitted with hospitals expressly built for to receive and keep the leprous persons. But many years since Ireland hath been almost quite freed from this horrible and loathsome disease, and as few leprous persons are found there as in any other countrie in the world; so that the hospitals erected for their use having stood empty a long time, are quite decayed and come to nothing.'

"The earliest notice of a leper hospital in Ireland was in 869, when the hospital flourishing at Armagh was demolished and sacked during Arlaf's invasion."

The introduction of the potato into Ireland occurred in 1590, and with it came a great change in the diet of the peasantry. Leprosy persisted, however, in feeble prevalence several centuries longer, and is said to still occur.

Dr. Shapter's Conclusions.

Dr. Shapter was a distinguished Exeter physician. Residing near to districts where leprosy and leper-homes had formerly abounded, he became interested in the subject and recorded the result of his investigations in an interesting paper which Dr. Newman summarises as follows:—

"Dr. Shapter of Exeter, who wrote in the beginning of the present century, is of opinion that there was a good deal of exaggeration anent the disease. He draws various conclusions which may be culled from various parts of his book. They are as follows:

"(1) That leprosy was an established European disease anterior to the Crusades.

"(2) That institutions of refuge for the afflicted were numerously provided.

"(3) That the lepers themselves were under the especial care of the

Church, and that the movement on their behalf was largely an ecclesiastical movement.

"(4) That from their very first establishment these institutions were not founded as 'separating' houses or houses of pestilential seclusion, but that they were solely the charitable resorts of those afflicted with a peculiarly distressing and loathsome disease. These immense charities were at length administered under great abuses, and afford no accurate ground upon which to calculate the extent or prevalence of the disease."

DETAILS AS TO THE MANAGEMENT OF LEPER-HOUSES.

The following notes refer to the Sherburn Hospital when under the supervision of Pudsey, "the joly Byshop of Durham." Dr. Newman writes:—

"We have the record of many interesting details of the inner life of a leper hospital such as this, in Surtees' 'History' (vol. i, pp. 127—138) and Allan's 'Collections.' From these sources we learn that the daily allowance of the lepers was a loaf weighing five marks and a gallon of ale each ; and between every two lepers one mess or commons of flesh three days in the week, and if fish, then cheese or butter on the remaining four days : on high festivals a double mess ; and in particular on the Feast of St. Cuthberth in Lent, fresh salmon if it could be had, if not then other fresh fish, and on Michaelmas Day four lepers messed on one goose. With fresh fish, flesh or eggs, a measure of salt was delivered (the twentieth part of a razer). When fresh fish could not be had, red herrings were served three to a single mess, or cheese and butter by weight, or three eggs. During Lent each had a razer of wheat 'to make furmenty,' and two razers of beans to boil ; sometimes greens or onions ; and every day, except Sunday, the seventh part of a razer of bean meal, but on Sunday a measure and a half of pulse to make gruel. Red herrings were prohibited from Pentecost to Michaelmas ; at the latter each received two razers of apples.

"The lepers shared a common kitchen, a common cook, and utensils and firing for cooking, &c., viz., a lead, two brazen pots, a table, a large wooden vessel for washing or making wine, a laver, two ale pots, and two bathing pots. The sick (*i.e.* those unable to get about at all) had fire and candle and all necessaries, *donec melioretur vel moriatur*, and one of the chaplains was assigned to hear the confessions of the sick, and read the gospel to them on Sundays and holy days, and to read the burial service for the dead. The old woman who nursed the sick and the grave-digger were both fed extra when extra work had to be done.

Each leper had a yearly allowance for his clothing of three yards of woollen cloth, white or russet, six yards of linen, six yards of canvas; and on the day on which the 'tayler' came to cut the clothes he had his meat and drink. Four fires were allowed for the whole community. From Michaelmas to All Saints they had two baskets of peat on the mess days, and four baskets daily from All Saints to Easter. On Christmas Eve they had four yule clogs, each a cartload, with four trusses of straw; four trusses of straw on All Saints' Eve and Easter Eve, and four bundles of rushes on the eves of Pentecost, St. John the Baptist, and St. Magdalene, and on the anniversary of Martin de Sancte Cruce every leper received 5*s.* 5*d.* in money.

"The lepers had the liberty of seeing their friends; and strangers who came from a distance were suffered *to rest in the hospital all night*, but visitors from the neighbourhood departed in the evening, and when the bell sounded for supper the gates were closed.

"Disobedient members were punished at the discretion of their prior and prioress by corporal correction, *per ferulam modo scholarium*, and offenders who refused to submit to the usual discipline were reduced to bread and water, and after the third offence were liable to be ejected.

"The following were some of the rules to be observed by all the lepers in the St. Julian Hospital: (St. Albans).

"That those who were infected were to humble themselves below all other men.

"That they should wear a habit suitable to their infirmities, viz., a tunic and upper tunic of russett cloth, a hood and black cloak, stockings and flat shoes, with upper leathers about their ankles.

"That those admitted be single persons, or, if married, to part by consent and vow chastity, and if afterwards found incontinent to be expelled.

"To go to church regularly and continue in brotherly love.

"None to go beyond the bounds prescribed.

"None to go into the bake-house or brew-house.

"None to touch anything, because persons under such a distemper are not to handle what is for the common use of men."

"Their diet was not very varied. Each leper had seven loaves every week—five of white, and two of brown or black bread. Every seventh month each man had fourteen gallons of ale, and on Christmas Day each had forty gallons of ale; on St. Martin's Day each had a pig from the common herd.

"For some years previous to 1349" (according to Mr. Trail) "only one, two, or three of the six beds could find leprous occupants."

The mastership of Julian's is twice mentioned in the abbey chronicles as a valuable piece of preferment. In 1254, the lands of the hospital were so heavily taxed for the king and the pope that the *miselli*, according to Matthew Paris, had barely the necessities of life. In 1350, the revenues were too large for its need, and new statutes were made; the accommodation of its six beds was by no means in request, the number of inmates never being more than three. The fate of the other leper-houses of St. Albans Abbey, and that of St. Mary de Pratis, founded by Abbot Warren, about a century after St. Julian's (for women), is not less instructive. The date of foundation is unknown, but in 1254 it had a Church and a hospital occupied by *misellæ*. A century later we hear of the house being shared between sisters and nuns.

LEPROSY IN LONDON.

Still quoting from Dr. Newman's essay we read:—

"During the fourteenth century various mandates and regulations were made. In 1346, Edward III. ordered 'that all persons who have such blemish (of leprosy) shall within fifteen days from the date of these presents quit the city and suburbs aforesaid' to solitary country life. The mandate also ordered 'that no persons shall permit such leprous persons to dwell in their houses' on pain of forfeiture of house and property. In the same document there are references to the prevalence of lepers and the mixing of diseased people with the healthy, and that this should be prevented and fewer errors made and the diagnosis of leprosy placed in more skilled hands, 'certain discreet and lawful men who have the best knowledge of the disease' shall make careful and diligent examination of suspicious persons.

"Some twenty-five years later we hear of a case in point. 'John Mayer, baker, smitten with the blemish of leprosy was sworn before the mayor and aldermen at the husting holden on the said Monday that he would depart forthwith from the city and would make no longer stay within the same.' And many other cases might be brought forward to illustrate not only the prevalence of the disease of 'leprosy' but also the difficulty that the municipal authorities had in controlling lepers coming in and going out of the city. It was only three years after the case of Mayer that the porters at the city gates of Aldgate, Bishopesgate, Cripulgate, Aldwichesgate, Newgate, Ludgate, Bridgegate, and the Postern (near the Tower) were sworn before the Mayor and Recorder 'that they will not allow lepers to enter the city or to stay in the same or in the suburbs thereof.'

"In 1389, a curious revelation is brought to light of the method of management of misconducting lepers in the city hospitals, viz., a royal exemption of 'our dear and well-beloved Robert Yvyughoo and Gilbert

Rothyng, keepers and overseers of the lazars,' from various municipal duties like inquests, juries, summonses, &c., because it is their duty 'to chastise and punish offenders (lepers) against their rule' and 'in doing these things the said Robert and Gilbert are oftentimes occupied and hard-worked' and 'cannot occupy themselves about their trades and business so much as they find themselves occupied in their said duties,' therefore considering 'their meritorious labour, their unpleasant and onerous occupation,' &c., they are to be exempted as above. By which it would appear that the lepers were disorderly and also that their 'overseers' were traders and business men giving some of their time to attendance and supervision of lepers' hospitals. All of which would confirm me in my belief that the general arrangements of the affairs of the leper-houses were in almost every way lax and irregular.

"The separation of lepers above referred to was in no way a new regulation. Leprosy 'being highly contagious,' the lepers were separated from all human society. (Carlisle believes that is why there was no leprosy in England in the seventeenth century.) A like arrangement had been an established rule from the earliest antiquity. But to what extent this separation was enforced one may learn from the method of enforcement of the writ *De Leproso Amovendo,* which applied to a man who was a leper dwelling in any town who persisted in coming into the church or amongst his neighbours where they were assembled, to their annoyance and disturbance. Then he or she of the assembly might sue forth that writ for to remove him from their company. The writ arranged for examination and removal to a solitary place. But it seems as if a leper kept himself within his house and did not converse or mix with his neighbours, that then he was not to be moved out of his house.

"This at once shows how very lax, careless, and therefore useless the 'segregation' was."

Dr. Cookson, in a paper read before the Lincoln Topographical Society, Lincoln, in 1841, says:—

"In the times when leprosy was general in England immense tracts of land lay waste and uncultivated; gloomy forests occupied spots which in our own days are covered with innumerable flocks and herds or wave with the blessings of harvest. . . . Provisions long salted were a common article of diet, from the noble to the peasant. Fish was largely consumed sometimes soused or pickled, sometimes preserved in a dry state; it was then called stock-fish because it had to be beaten on a stock, or wooden anvil, with a mallet, before it could be employed for culinary purposes."

Dr. Cookson adds:—

"Concerning the writ *Leproso Amovendo* Judge Fitsherbert says 'It will lie not if the leper do but confine himself within his own house.' 'A compendious method of spreading the disease throughout the whole family supposing the leprous member to be really and truly a source of infection."

LEPROSY IN NORFOLK.

Mr. Cadge, of Norwich, was some years ago kind enough to obtain for me much information as to leprosy in Norfolk. He applied to a distinguished county historian, Rev. Dr. Jessop. Dr. Jessop wrote that during the fifteenth century there was scarcely a will of any importance put on record in the Norwich Archives which did not contain a bequest for the benefit of "the lazar houses outside the gate." There were few large towns in Norfolk which had not their lazar house, Norwich had several and at Wymondham a row of cottages is still known as the Lazards.

As leprosy became scarce these houses became refuges for the destitute. At no time probably had they been used exclusively for lepers.

LEPROSY IN CORNWALL.

The following letter was addressed to me by the late William Square (the elder), of Plymouth. It is of much interest as illustrating the real nature of the mediæval leper-houses. They were not places for compulsory segregation, but of privileged retreat. The lepers were to elect each other. It also gives the date of the last leper in Cornwall —the county in which leprosy lingered longest in the British Isles:—

"Staying at the White Hart, Launceston, on the way home from seeing a patient, I found an old copy of 'Gilbert's History of Cornwall,' published 1820. After a description of Bodmin it says near by is the village of St. Lawrence. On the front of a poor dwelling, facing the market house, is placed a tablet with the following inscription: 'Richard Carter of St. Columb, Merchant, by his last will and testament in anno domino 1582, did give 10 pounds for the assurance of 20 shillings yearly, to be paid unto us, the poor lepers of the Hospital and our successors for ever: which 10 pounds, by the consent of his executors we have employed towards the making of this house anno domini 1586, whose charitable and rare example in our time, God grant may be followed hereafter.' This lazar house was incorporated by Queen Elizabeth and had a charter. The last patient died in 1800. The last holders, finding the house in disrepair, sold it, and a chancery suit resulted, and the whole incorporation was appropriated by the County Infirmary Fund. In the charter it says, 'These poor men and women to be leprous people and to elect one another.'"

Leprosy in Essex.

Eudo Dapifer, in the reign of Henry I. founded St. Mary Magdalene's, eastward of St. Botolph's at Colchester. King Stephen augmented this endowment, and Richard I. granted the lepers "liberty to hold a two days' fair." We shall have occasion to notice that, amongst the different methods for supplying necessary funds, this quaint and curious plan of "fairs" was adopted.

At Ilford, in Essex, a hospital was instituted in the reign of Henry II. or before (Lysons). It was dedicated to the Virgin Mary and St. Thomas the Martyr, and was founded by Adelicia. Re-patronage of the house was confirmed by at least two kings—Richard II. and Henry IV. Amongst the old regulations there were two which read as follows:—

"That no married leper be admitted unless his wife at the same time become a nun.

"That the lepers go not out of the enclosure without leave."

The primary establishment was for "thirteene pore men beying lepers, two pryests, and one clerke; thereof there is at this day but one pryest and two pore men." Such was the report in the commission of Edward VI. By the same royal commission (1547) most of the leper houses in England were reported as empty, although many apparently existed in Scotland and Cornwall.

Still Occurring in England in the Sixteenth Century.

In proof that leprosy still prevailed in certain parts of England in the sixteenth century we have several records. Heutzner, in 1598, travelled through England, and observed in his 'Itinerary': "*Angli laborant frequenter leprâ albâ vulgo dictâ.*" And it is not infrequent to find references to the existence of leprosy as an endemic disease as late as the time of James I. and even down to 1712, 1737, 1786. The following is from Newman's Essay:—

"It is not known when the hospital at Bodmin was established, but in 1395, Bishop Stafford granted an Indulgence which was repeated in 1435. Queen Elizabeth granted a charter in which it is stated that there were and had been 'a great company' of lepers in this hospital. A few months after his accession, James I. granted them—there were then, according to Lysons, thirty-nine lepers—a weekly market on Wednesdays, and 'an annual fair with a court of piepowder on the festival of St. Luke.' 'In the time of Elizabeth,' says Polwhele, 'leprosy seems to have been frequent in Cornwall.' He believes that the disease first spread in England about 1100, and was largely due in Cornwall to traders. It would appear that at the Bodmin hospital—even though the *leproso amovendo* was in action—the custom was that none were to be admitted by the governors 'unless the leper so brought in payd them £5, a pot for dressing his meat, a purse (and a penny in it) to receive alms.' In 1800 there were no lepers in the hospital."

WAS SEGREGATION CARRIED OUT?

Dr. Newman after putting the question—"Was segregation carried out?" writes as follows:—

"I have already pointed out that with half-a-dozen exceptions, the houses, pest-houses, lazar-houses, lazarettos, leper 'hospitals,' were in no strict sense to be described as hospitals. They were ecclesiastical, not medical, institutions; refuges, not places for treatment; palliative, not radical. It is true there were divers laws and regulations enacted, and more or less enforced, with regard to detention of lepers and preventing them obtaining access to the city of London; but that any system of proper segregation existed, I have been able to find absolutely no evidence at all. Indeed, all the evidence points in the other direction. The lepers were allowed to go into the markets and fairs; and friends and wayfarers were constantly allowed to reside in the leper hospitals. The mixed character of the hospitals is well illustrated in the case of Lynn (1145), which provided for twelve brethren or sisters, nine of whom should be whole and three leprous. St. Leonard's, at Lancaster, also provided for nine poor persons, three of whom might be leprous.

Even the detection of leprosy was left to the laity and inferior officers, who were almost wholly ignorant of this disease. Undoubtedly the general public had a strong dislike to meeting or communicating with a leper—partly because of his unsightliness, partly because of superstition, partly because of supposed infection, &c. ; undoubtedly, therefore, the lepers were much shunned, and lived much in solitude—but that there was in any sense a *strict* separation of the diseased from the healthy, or that the *De Leproso Amovendo* was strictly and constantly enforced, I can find no substantial evidence. But I have found a very large mass of evidence wholly to the contrary. A recent writer states : 'The great object (of the leper hospitals) in view was not the cure of leprosy, for then as now leprosy was deemed incurable, but to arrest the spread of it, to prevent the contamination of the sound by contact with the infected.' This presupposes at the outset that leprosy *was* infectious or contagious, a point I shall have occasion to refer to later on. And certainly no one can carefully read the detailed accounts of the various leper hospitals in England and feel assured that they acted as 'arresters' of the spread of the disease. Unless segregation is carried out strictly and *in toto*, the point and principle of it is obviously lost. I do not doubt that segregation was one of 'the objects in view,' but I can find no proof that it was in any case satisfactorily carried out."

At another place he adds :—

"Many authors apparently share the view . . . . . . that 'isolation' and 'strict segregation' was carried out rigorously in the leper hospitals, and was the cause of the decline of leprosy. Let me repeat the well-founded conclusion of Shapter, that these institutions were nothing more than 'charitable resorts'—and in many cases that were too good a name for them, for it is not difficult to discern the avaricious abuse that went on in connection with these places. With the view of Shapter, Sir James Y. Simpson wholly agrees."

Dr. Creighton in his "History of Epidemics in England," bears important testimony on this point. He writes :—

"The endowed hospitals of mediæval England were in no exclusive sense leper-hospitals, but a general provision under religious discipline for the infirm and sick poor, for infirm and ailing monks and clergy, and here and there for decayed gentlefolks. 'We doubt whether many of the so-called leper-houses or lazar-houses in the list of one hundred more or less that may be compiled from the *Monasticon*, were not ordinary refuges for the sick and infirm poor, like the three or four hundred other religious charities of the country. We know that in some instances for leper-hospitals well authentic charters for the provision of the leprous was in the proportion of one to three or four of non-leprous inmates. We know that as early as the end of the thirteenth century the *leprosi* were disappearing or getting displaced even from hospitals where the intentions of the founder were explicit.' "

Dr. Creighton even suggests that there was some advantage from being called "leprous," and that "a halo of morbid exaggeration surrounded the idea of leprosy in the mediæval religious mind, *pauperes Christi*."

The same author in his admirable contribution to Cassell's "Social England," gives the following details:—

"The leper-houses were only a small fraction of all the charitable houses in England, perhaps a sixth or eighth part, and probably not more than fifty in all. One at Durham had accommodation for sixty lepers, men and women; Matilda's Hospital, in St. Giles's Fields, outside London, had a chapel and hall for forty lepers, who must have slept elsewhere; the hospital at Ripon, 'for all the lepers in Richmondshire,' had eighteen beds; that of Lincoln had ten beds; and the male leper-house of St. Albans Abbey, had six beds. They were generally heavily staffed with ecclesiastics; some were for leprous and non-leprous patients side by side, three or four of the former to six or eight of the latter; others were for sick or 'leprous' monks and priests, or for the same class when they 'grew old, leprous, or diseased.' As early as 1279 the leper-hospital of Stourbridge, near Cambridge, had been alienated from the leprous by the Bishop of Ely; inquisitions in the reign of Edward III. showed that the leper-hospitals at Ripon, Oxford, and elsewhere, contained no lepers; St. Albans, for some years previous to 1349, only one, or two, or three of the six beds could find leprous occupants; and in 1434 new statutes had to be made for the great Durham leper-hospital, by which it was provided that two beds should be reserved for lepers 'if they can be found in these parts,' in order to preserve the memory of the original foundation. In fact, even the few hospitals which were clearly designed, in whole or in part, for lepers were gradually diverted to other uses, and this, too, in some cases within living memory of their being founded; and although that may have been owing in part to the avarice of the clergy, yet it must have been chiefly because there was no further use for them as leper-houses, or perhaps because there had been from the first something forced and unreal in the chivalrous movement which started them.

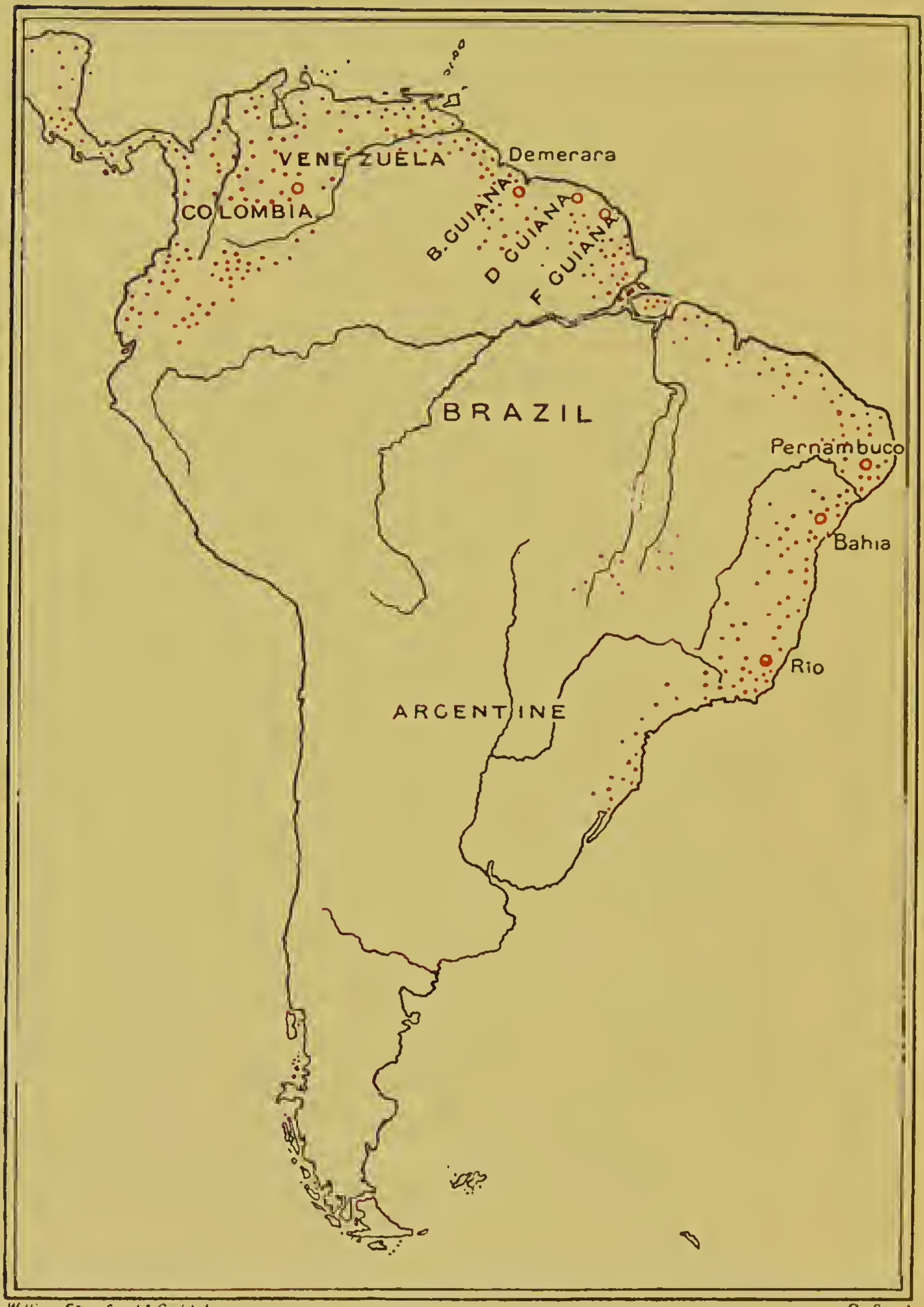
"Not only did several of the leper-hospitals provide in their charters for a majority of non-leprous patients, but even those inmates that passed as leprous were a heterogeneous class of sufferers—from chronic or incurable sores, eruptions, tumours, and deformities."

Fish-Eating in England.

In illustration of the fish-eating habits of the English people, I may cite the following from Dr. Newman's essays :—

"I may quote from the kitchen accounts of Humphrey, Duke of Buckinghamshire (1443 to 1444). Mention is there made of the purchase and storage of '10 barrels salt herrings, 11 cades fresh herrings, 6 cades sprats, 3,379 salt fish, 3,060 stock-fish, 6 barrels salt salmon, 1 barrel cod, 1 barrel and 13 salt eels, 1 barrel sturgeons, 12 lampreys, 1 pair of porpoises.' In 1466, at the feast to commemorate the instalment of George Neville as Archbishop of York, 608 pike and 12 porpoises were used. At a similar ceremony in 1504, when Warham was made Archbishop of Canterbury, the following quantity of fish was used :—300 ling, 600 cod, 7 barrels salted salmon, 40 fresh salmon, 14 barrels white herrings, 20 cades red herrings (600 herrings in each cade), 5 barrels salted sturgeons, 2 barrels salted eels, 600 fresh eels, 8,000 whelks, 500 pikes, 400 tenches, 100 carp, 800 bream, 2 barrels salted lampreys, 1,400 fresh lampreys, 134 salted congers, 200 great roaches, and a quantity of seals, porpoises, and other fish. This feast occurred, as it is stated, on a 'fish day.'"

PLATE XV.



MAP OF SOUTH AMERICA SHOWING THE PRESENT DISTRIBUTION OF LEPROSY. (o denotes a leper-asylum.)

[*To face page* 305.

APPENDIX.

PART I.

MISCELLANEOUS QUOTATIONS AND STATEMENTS OF FACTS.

THE only apology which can be offered for the presentation of the following fragments in such a disconnected manner is that had an attempt been made to weave them into consecutive narrative they would have occupied much more space. They must be accepted as being for the most part supplementary to what has been advanced in the preceding chapters, and it is hoped that the GENERAL INDEX will obviate any serious inconvenience to the reader.

LEPROSY IN BRAZIL.

The following facts were communicated to me in 1873 by a physician (Dr. J. Hall) who had resided long in Brazil :—

> "London, April 19th, 1873. I have seen during many years' residence in the Brazils numerous cases of elephantiasis of the Greeks. It occurred in all ranks, at almost all ages, from childhood to old age, in both sexes, and in most of the races inhabiting that country, the aboriginal Indian, the African, the Brazilian-born black, the coloured or mulatto, and even in the Portuguese; so that neither sex, race, age, nor social status gave exemption from the disease. The Brazilians universally and very firmly believe that the disease is contagious, although to my mind there is not a vestige of scientific evidence to prove this—quite the reverse. My experience, however, makes me believe that this disease is hereditary. Of the causation of the disease it is difficult to speak, for the disease, as above stated, is known to attack all grades, all ages, and differing races—that is, its victims seemed to be placed in very different hygienic and dietetic conditions. Thus the diet of the lower orders consists chiefly of cassava flour (*Jatropha manioc*, I think); they often eat a species of shrimp or prawn, preserved by being dried in the sun, and which is highly indigestible; but they by no means live much on fish, which

is rather dear and scarce; nor are any fasts kept when only fish is eaten, except Passion Week. The Portuguese certainly use salt cod-fish freely as an article of diet, but they are by no means more attacked by the disease than others. The upper ranks have a diet somewhat similar to the European, using, as a rule, more spices and condiments with their food, which is true of everyone else in the Brazils, particularly red and black pepper ; they use, also, sweet oil in their thickening more than is customary with us. Maranhao —of the inhabitants of which I speak—is a town in the north of Brazil, of 40,000 inhabitants, about 3° S. The city is clean, houses large, well-built, and constant sea-breeze modifies the heat greatly; it is very healthy, escaping the epidemics that desolate the other Brazilian towns. The water drunk is excellent, few as soft and good, none perhaps better—at least, so have seafaring people, who have been to all parts of the world to water their ships, said to me. The extreme heat forces ventilation of the houses, and invites the frequent use of the cold bath; the few clothes used are frequently washed; the people, as a rule, never suffer the extreme wretchedness and privations so common in this country, and are sober, wages high, the few absolute necessaries of life cheap ; *yet in Maranhao this disease is common.* It is true that, as far as I have been led to believe, the disease is more prevalent in Pará, the hygienic conditions of which are bad, and where they do use very deleterious fish as food, but about Pará I cannot speak from personal observation. It may be interesting to remark, when thinking of the curability of the disease, that one of my grandfathers, a very large slave-owner, a believer in the contagion of the disease, used to banish all slaves attacked to the heart of the forests, as far as possible, of course, from his plantations. After the lapse of many years, I believe that this leprosy colony was visited, and it was then found that some lepers had recovered, and also that there had been healthy progeny from leprous parents."

The following notes were kindly written out for me (in 1879) by Dr. J. L. Paterson, now of Edinburgh, who had formerly resided in Brazil :—

"I am sorry all I can communicate is in itself so meagre, and mostly of a negative character. In tracing back the many cases I saw to their origin, the one only positive fact I could make out was the hereditary transmission of the disease, or, to speak more correctly, the greater liability of certain families to suffer from it. What I mean by this distinction will appear from the following history: There was in Bahia a household, all Portuguese by birth—two brothers, married to two sisters, their cousins. One of these sisters, after her marriage and long after having borne children, manifested symptoms of tubercular leprosy, returned to Portugal, and three years later died of the complaint. Two of her daughters from early girlhood suffered from the anæsthetic or musculo-atrophic form of the disease. The other sister never manifested any symptoms of the disease; and yet two of her daughters, from about ten years of age, began to suffer from the blotching of the skin that generally preludes the breaking out of the tubercular form, and, though sent at once to Portugal, the disease pursued in them a course as rapid as I have ever seen it do. Now, these children's mother had never manifested any symptoms of the disease, and their aunt—so I was ever assured—was the first in their family, as far as they could trace it back, that had been afflicted with the malady. This family was healthy, living on the best of food and in the most hygienic surroundings. Knowing that in other countries the disease had been attributed to improper diet—abuse of fish, putrid fish, etc.—as also to filthiness of habits, I looked in vain for these as having any appreciable influence on this development in Brazil. It was certainly as common among the wealthy and well-fed as among the poor, as frequent inland as among the dwellers by the sea; and filthiness of habit is, as you know, unknown in Brazil. Clothing is of the scantiest—by the well-off changed every day, by the poorest twice a week—and no one, from the Emperor on the throne to the maid-servant that is behind the mill, is without at least one bath a day. I cannot suggest the slightest explanation of its origin in any given family. Thus, I know a Brazilian family consisting of one brother and four sisters, all married, and all having large families. The brother was married to a Brazilian lady; of the four sisters, one was married to an Englishman, one to a Portuguese, and two to Germans, brothers. In none of all those families was there any antecedent history of leprosy, and yet one of the German children, two years after leaving Brazil and while studying in Hamburg, showed signs of the anæsthetic form of the disease, accompanied by wasting in the muscles of the hands. The diseaso was unrecognised in Europe, and the poor boy got many a flogging at school for want of tact in his hands. On his return to Brazil, when about eighteen, the case was at once recognised, with what horror to his family you may surmise, it having by this time passed into the tubercular form. I left him still suffering from the disease, in a gradually progressing degree, he alone of all his brothers, sisters, or cousins, the one stricken. I have often sent children to Europe immediately on the first appearance of symptoms of the disease, but have never in any case seen the progress of the case in the slightest stayed by that measure. How different from beri-beri! I know of no remedy that has any permanent effect on the progress of the disease. *I have never known a single case in which contagion could be supposed to have given rise to the disease.* In the lazar hospital at Bahia no attendant has ever caught the complaint, nor have tho women who wash the linen of the patients. The populace believe it contagious. It is also believed to be due to fish too exclusively used. Salt codfish from Newfoundland is much usod. Salt codfish and salt meat are almost the only kinds of flesh food. Fresh-fish, from the sea, is also much eaten. In a great measure dependent on fish, Brazil is only populated along the coast. Fish will only keep a few hours; it is often stale before it can be got to tho house. A kind of shark is much salted and eaten. Brazilians never eat tainted fish or highly-kept articles of any description. Leprosy occurs inland somewhat. It is equally common in the woalthy and poor."

The testimony here borne to the absence of any plausible explanation is most valuable. We have, so far as my hypothesis is concerned, only to remember that Brazil is, at present, under the same *régime* as that which prevailed in Europe in the ages of Catholic ascendancy. Its population is Catholic and the fasts are observed. Salt-fish is imported for use on fast-days, and is used by all classes alike and equally by both sexes. As a result, we find leprosy occurring in all classes and almost equally in the two sexes. The Indians, who keep no fish fast-days, are by some observers said to be free.

LEPROSY IN MEXICO.

I received from a surgeon who had resided for five years in Northern Mexico some interesting facts. Dr. Fenn's appointment had been in connexion with some mines at Arteaga, a district in Chihuahua, inland to east of the Gulf of California. He had observed at his dispensary that a certain number of leprosy patients came from a mountain village, Temoris, in the Cordilleras. He determined to visit the village, and found that it consisted of about fifty families, amongst whom were several lepers. They observed no precautions, and most of them were mild cases. One had had the disease for twenty years. The village was 4,000 feet above sea-level, and in a very dry district. At the time that Dr. Fenn was there, no fish was obtainable, and it was Passion Week. There was, however, a river about an hour's journey from the village, and salt-fish did occasionally travel to the place. The village had formerly had its mines, and it had also had a settlement of Jesuits. Leprosy had been present for many generations, and was for the most part disregarded.

Dr. Fenn believed that in the surrounding district, indeed in the whole of Northern Mexico, there was a sprinkling of leprosy, but nowhere except at this village was it concentrated. The whole of the population were Catholics, but of late years by no means strict. Dr. Fenn thought, I believe, that his facts were opposed to the fish theory, the supply of salt-fish to this particular village being, he believed, small and infrequent. I suggested, however, that after all, the place had been both a mining and a Jesuit centre, two conditions which would certainly create a demand for fish. Its distance from sources of supply, and the fact that the fish could only be conveyed on mules, whilst restricting the quantity, might much interfere with its quality. Dr. Fenn admitted that in the district fish in bad condition was frequently eaten. Inasmuch as no other reason was forthcoming, and there is good reason to believe that leprosy was not indigenous to Mexico, it seems most probable that we have another instance of association of the disease with religious creed. Were it not for the fast-days, probably no salt-fish would find its way into the mountains. We may note that in Crete a certain part of the inhabitants, the Sphakeots, who have taken to the mountains, are quite free from leprosy, whilst those of the plains suffer severely. They are, however, members of the Greek Church, which forbids fish as well as flesh on fast-days.

Notes of my own Visit to Howick (Natal).

On the morning of January 11th, conducted and very kindly assisted by Dr. Wyllie, of Howick, I visited within a few miles of that town several Kaffir kraals where there were lepers. We had the assistance of a native policeman who knew the cases, and of Mr. Stead, the magistrates' clerk and interpreter. The latter gentleman was invaluable to us.

Howick is the centre of the Lion's River district. In reports to the Government, from 1888 to 1894, seven cases are all that were mentioned, of whom five were males. The ages of the patients whom I saw and the duration assigned to their disease make it probable, that none of those previously reported were forthcoming at the time of my visit. In that report it did not appear that there was more than a single leper at any one place in the district.*

At the first kraal visited we saw two patients, and were informed of a third who had gone away for the day.

Case I. A woman probably about 50. Her ulnar fingers were contracted, and the ulnar nerves much enlarged. She had dusky patches on the back, and although she had no facial symptoms and no mutilations, I made not the slightest doubt as to diagnosis. She had borne two children, but they were dead. She knew of no cause for her malady, and said that it had been present about two years, that she had been born at Weenan, and that it had begun where she now lived. She was a Zulu, and alleged that she had never eaten fish.

---

* The places there named were Hebron, Cedare, Furth, Joe Raid's Farm, Woodlands, and Kimberley Farm, one at each.

Case II. was a fine healthy-looking young man of about twenty-five. He had ulnar-nerve-paralysis and large patches on the back. He was the son of the husband of the previous patient, but not her son. His father had died of stomach disease. He did not know of the disease in any predecessor, and neither father nor mother had it. He knew of no cause, and had never known anyone who suffered from the disease.

Case III. The subject of this case we did not see, but were told that he was in a worse state than either of the preceding. He lived in the same kraal, not in the same hut, and he was not a blood relation. He was gone to Zwartkop.

Cases IV. and V. At another kraal a man, himself in good health and with a healthy family about him, admitted that two of his sons were reputed to be lepers. He doubted it. One, the younger, aged probably about fifteen, was after some difficulty fetched from a neighbouring kraal for us to see. He had a characteristic physiognomy, eyebrows gone and skin thickened, features swollen, lobules of ears swollen. His hands were not severely affected, but the ulnar nerves were thick, and the ulnar regions somewhat numb. There were patches on the back. He could use his hands fairly well. He averred that he had never eaten fish. His elder brother, whom we did not see, was stated to have patches, but he was not at all disabled. He was, we were told, gone to Table Mountain to put himself under the treatment of a native doctor. There was not in these cases the slightest clue to any source of contagion or inheritance, and all eating of fish was denied.

Case VI. At a third kraal a man aged twenty-one, who looked in good health, had wasting of muscles in both hands, especially of those supplied by the ulnar nerves. The latter were thick. He had also very characteristic and conspicuous patches on his back. There was no anæsthesia. He had an elder brother who was affected, and who was gone for treatment to Table Mountain. He knew of nothing suggestive of either contagion or inheritance. He had, he alleged, never eaten fish. He and his brother had been to Maritzburg to work, but never to any town in Cape Colony. He was of the Mboza tribe.

Remarks.

The several kraals which we had visited were situated at distances of perhaps about a mile apart. They were on hills in a fine district. It will be seen that we had been made acquainted with six cases, and it was not improbable that there were a few more in the district. Those whom we had seen were mostly young men, and making allowance for the prolonged introductory period in leprosy, there could be but little doubt that they had acquired the disease at their homes, and probably in very early life. One of them was indeed still only a boy. The statement that they had never left their homes and that they had never eaten fish was beyond dispute.

Their district is one in which fish is hardly obtainable, and they belong to a race whose members, at any rate when at home, never eat it. In two instances two brothers were affected together. I felt compelled at once to accept the position that leprosy may occur in persons who have not themselves eaten fish, and that it may be communicated under some ill-understood conditions from person to person. In no instance, however, had we obtained proof of any close association with lepers. The district was one in which leprosy had been known for two generations at least, and this was as far as we could get. As to how it had been introduced, we had no facts. At this stage of the enquiry it had not occurred to me to ask especially as to possibility of communication in eating, and no special questions were asked as to whether these patients might by any possibility have been fed in childhood at the breast or from the hands of a leper. Taking into consideration the fewness of the cases and the large number of those who had apparently been equally exposed to risk, such an occurrence would seem to be the most plausible explanation of the facts. In the case of the woman who was fifty years of age, and who had recognised her symptoms for only two years, this suggestion is perhaps rather less probable.

Notes of Visit to Boston, Natal. Do Kaffirs Eat Fish?

At Boston, a little store, five-and-twenty miles from Maritzburg, its intelligent proprietor gave me some interesting facts. He knew of but one leper in the district, a Kaffir named Piet. This man, he said, had for long been well known as a leper; had suffered for many years, and had lost his toes and fingers. He was so disabled that he could not work. His neighbours in the kraals avoided him for fear they should catch it.

"But does he live in a hut alone?" I asked.

"Oh, no; his wife and children live with him."

"And none of them have caught it?"

"No; he is the only one in the district."

I wished to visit this man, but found he was too far off.

My informant told me that in a district in which he had formerly lived there were several or even "many" lepers. I asked as to their eating fish. He assured me many Kaffirs were exceedingly fond of sardines. He, himself, sold large quantities of them. He sold them at sixpence a box. The Kaffirs were very particular as to quality, and would often insist on the box being opened before they took it. This cautiousness was, he said, because many years ago some traders brought up bad fish, and many Kaffirs died from poisoning by it. Since then they had been suspicious; but many of them were very fond of the article.

"Are you sure that true Kaffirs in this district will eat fish?"

"Yes, many of them; not all. A Kaffir in my employ will do anything for me if I will give him fish. There is undoubtedly a prejudice against fish with many: they fear to eat their ancestors or gods; but many have put aside this prejudice and take it freely when they can get it."

"And they do really buy sardines freely?"

"Oh, yes. You can look at my books if you like."

I said that at Howick I had been told differently.

"Oh, the Howick man caters for whites and not for the Kaffirs, and does not know what the Kaffirs buy. You may ask at any store you like on the road, and you will find that I am right. The Kaffirs buy tinned fish freely."

"Do they eat it fresh?"

"Yes, I believe so. They eat putrid meat; but I believe they are particular as to their fish since the occurrence of the poisoning."

[I afterwards learnt that this statement as to the poisoning referred not to the Polita district, but to Swaziland.]

Leprosy in Native Territory (South Africa).

February 11th, at Cala (Xalaga district).—At Cala I called on Dr. Craistor, the district medical officer, concerning whom I had been told that he was a man of keen observation and much experience. He had written in a report to Government that he believed that there was more leprosy in his district than had been reported.

Dr. Craistor at once told me that he felt sure that leprosy was in some unknown way communicable, "but with difficulty." He did not think it contagious. The precise mode of communication was, he thought, unknown; and he did not believe that any leper was dangerous, excepting those who had open sores.

As to whether leprosy was increasing or not in his neighbourhood, Dr. Craistor would give no opinion. There were cases when he first came, twenty years ago, and there were new cases still arising. He had just been requested by the magistrate to visit and report upon three persons in one kraal who were reported to be affected. In former days most of the cases which he saw were well advanced and easy of recognition, but now he was often asked to see patients concerning whom it was difficult to speak with confidence. He instanced an example of this in a girl belonging to a leprous family whom he had inspected officially, and found on her only a few doubtful spots. He had declined to certify this girl, and should inspect her again in a few months. He expressed himself strongly as to the responsibility of giving a certificate which would entail life-long loss of liberty.

Having asked Dr. Craistor whether the Tembu tribes had any native name for leprosy, and whether the natives thought it a new disease, he said that he would send for a very intelligent man who could speak English, and I might put my own questions. A fine, stalwart, well-clothed Kaffir made his appearance, after a little delay, and after him followed another, for whom the first acted as an interpreter. They said that they knew of no other name for leprosy than that given in their translation of the Bible, and it was commonly known as "Lazarus." They thought that it had been known for three generations, but not longer; that it occurred chiefly to the "school-Kaffirs" (or Christians) as distinct from the "blanket-Kaffirs." They agreed that most Kaffirs, when in Cape Colony, would eat salt-fish, but only the converted would eat it at home, and it was not an article in large consumption in Tembuland. They attributed the disease to intercourse with the Hottentots.* Since the introduction of Christianity race prejudice had diminished, and there had even been marriages between Kaffirs and Hottentots. All the Hottentots ate salt-fish whenever they could get it, and they had taught the Kaffirs to do the same.

NOTES OF A VISIT TO ENGCOBO (SOUTH AFRICA).

During a five days' stay at Engcobo I had much very agreeable and instructive intercourse with Dr. Weir, the well-informed and zealous medical officer of the district. Dr. Weir had left Glasgow in 1880, and resided at the Mission station of Main till 1883, when he left it for Engcobo. He had been the visiting medical officer of the Emjanyana Asylum from its commencement, nine years ago, and up to the time that a resident physician was appointed. He had thus had a large experience of leprosy. He was a firm believer in its contagiousness and inclined to accept as indisputable everything which appeared to follow from the recognition of its bacillary causation. Thus there were materials for warm discussions between us. He told me that he would never accept the salt-fish theory until I could show him the bacillus in the fish. To which I replied that a blessing was promised to those who could, on occasion, believe without having seen.

---

* By the expression "Hottentot," in present use, must usually be understood bastards of mixed Dutch and Hottentot blood.

One of the first observations which Dr. Weir made to me was that he had known many instances in which leprosy was apparently introduced into a family by one of its members (almost always a man) who had been to one of the Cape Colony towns to work. I found afterwards that he had been so much impressed with this fact that he had made it a matter of comment in one of his annual reports to the Government. I told him that this was exactly the conclusion at which I had myself arrived by investigations in Natal, and we agreed also in the belief that such individuals having developed leprosy became causes of its spreading amongst their relatives. He mentioned some remarkable examples of this, and commented strongly on the erratic manner in which the disease appeared to spread. He could not remember a single instance in which husband and wife had suffered together. Yet the spreading was not infrequently amongst grown-up persons. When children suffered they were, in his experience, almost always children of leprous parentage on one side. He thought that Kaffir beer-drinkings were opportunities for the spread of the disease. The Kaffirs (Tembus chiefly) had, he said, no knowledge of the nature of the disease: it was new to them. They did not suspect contagion, and they took no precautions whatever. They would drink in succession from the same beer-can, and smoke the same pipe.

Dr. Weir thought that leprosy was a new disease amongst the Kaffirs, and believed that they had no native name for it. They thought that they had got it from intercourse with the Hottentots. He related an instance in which a Hottentot (or bastard) woman, who had come into Tembuland, became a leper. Two of her sons also showed the disease and died of it in Emjanyana. This woman's husband was a white man. He was much attached to his wife, and when she was admitted into the Asylum he obtained permission to accompany her, and took service in the establishment. Although his wife's illness had extended over many years, and they had lived together all the time, he never contracted it. Nor did he subsequent to his admission with his wife into the Asylum.

As regards Pondoland, Dr. Weir told me that he was certain that some lepers from that district had been admitted into Emjanyana.

NOTES OF THE EMJANYANA ASYLUM.

Emjanyana is the name of a small river in a wild hilly district in Tembuland; the most southern and westerly portion of what was formerly known as Caffraria. It has now given its name to a leper establishment. There is no village near it, and in the first instance the lepers were received into separate huts, which were built on the hillside. It was intended to reproduce home-life for the poor lepers, as nearly as possible, and to allow them as much liberty as was consistent with segregation. This plan, however, failed, for they were continually escaping and returning to their homes; and so after a year or two's trial two large compounds were built, about a mile apart, one for males and one for females, which, being enclosed, could be locked up and guarded at nights. In each of them at the present time about 200 lepers reside. There is land under cultivation close to them, and those of the inmates who are capable of it and so inclined are encouraged to employ themselves in field-work. In each instance the compound is a large square surrounded by living rooms, in which also the patients sleep. The arrangements are somewhat primitive, but they are such as the patients have been accustomed to, and which they prefer to more elaborate ones. All the patients are natives, and the majority are Tembu Kaffirs. There is no hotel at Emjanyana, and in fact no village; the whole is on Government land and is appropriated to the leper establishment. It is nine years since it was opened, and during the whole time it has been under the able control of Mr. Bain, son and grandson of the well-known South African geologists. In the first instance the establishment had no resident medical officer, but about five years ago a physician was appointed, who was succeeded after two or three years by Dr. Cassidy, the present resident. Dr. Cassidy and Mr. Bain live with their families in closely adjacent houses midway between the leper compounds. A few separate huts and small houses on the farm are still occupied by special cases in which the residents are there voluntarily, and are in circumstances to contribute to their own support.

Emjanyana is in a healthy position, and well adapted in most respects for the purpose designed. We were told, however, that in spite of somewhat extensive precautions, it is still found impossible to wholly prevent the escape of its unwilling residents.

The present accommodation is always fully occupied, and in the surrounding districts are probably not fewer than 500 certified lepers who cannot be received. The establishments appear to be exceedingly well managed, and so far as I could judge everything possible appeared to be done for the comfort of its unfortunate inmates. It is a Government establishment, and from time to time the Cape Town authorities have sent over medical inspectors.

Emjanyana is a place not mentioned in any guide-book, nor given on any map. No one excepting those in official positions know of its existence, and of these only a few know of its exact whereabouts. We had some difficulty in finding it, and for the convenience of future visitors it may be well to state that the nearest hotel is Mrs. Heath's, in the pretty village of Engcobo, which latter may be reached by post-cart from Cala, or from Umtata. From either of the latter places a private cart must be obtained. We were the guests of Mr. and Mrs. Bain during the two days that we stayed at Emjanyana, and received from them, and also from Dr. Cassidy, much kindness and most willing help.

EXTRACTS FROM THE CAPE OF GOOD HOPE HOSPITALS AND ASYLUMS REPORTS, 1897-1899. EMJANYANA LEPER ASYLUM.

From Dr. Weir's report, 1897 :—

"The numbers on 1st January, 1898, come to be as follows :—94 males; 88 females. Anæsthetic leprosy : 80 males; 76 females. Tubercular leprosy : 14 males; 12 females. 13 non-leprous children."

In 1897 there were 94 males and 88 females, (no great difference); but 14 males died, and only 7 females.

From Mr. Bain's report, 1898 :—

"There were resident in the asylum on the 1st January, 1898, 182 lepers (94 males and 88 females).

"During the twelve months the admissions numbered 102 males and 77 females, and there were remaining on the last day of the year 255 lepers (123 males and 132 females).

"62 lepers died during the year, of whom 50 were males and 12 females. There were in the asylum on the last day of the year 6 male and 3 female non-leprous children, born of leprous mothers.

"During the year homes were found elsewhere for 4 male and 3 female non-leprous children."

Particulars.	Males.	Females.	Total.
Discharged during the year	7	18	25
Transferred to Robben Island	7	2	9
Escaped	12	4	16
Died	50	12	62
	76	36	112

(Again more male than female deaths.)

From Mr. Bain's report, 1899 :—

"There were resident in the wards on the 1st January, 1899, 255 lepers (123 males and 132 females). During the year there were admitted 134 males and 30 females.

"There were 4 male and 3 female non-leprous children at the Female Asylum with their mothers, on the last day of the year."

Particulars.	Males.	Females.	Total.
Died during the year	48	14	62
Escaped during the year	40	5	45
Discharged	—	1	1
Transferred to Robben Island	6	—	6
	94	20	114

[Why this disproportionate fatality in men?]

"The strictest economy has been practised in every department with the result that the cost of maintenance during the past year computes to 1s. 6½d. per patient per diem."

The Glen Grey District. (Cape Colony.)

Lady Frere is the name of a pretty village in the centre of a large district known as Glen Grey. It is thirty-two miles from Queenstown and borders on the Xalaga district, to which Dr. Craistor is medical officer. Dr. Park, of Lady Frere, has for some six years been the surgeon to the Glen Grey district, and in 1897 he reported upwards of seventy lepers. In consequence of that statement I determined to visit Glen Grey and I did so in company with Dr. Batchelor, late Mayor of Queenstown. Dr. Park took much trouble in giving us assistance and also afforded me valuable information. In the village of Lady Frere itself we found, as usual in towns and villages, no lepers. None, indeed, were known of nearer than four miles away, and the majority were at much greater distances. Half-way between Lady Frere and Queenstown, sixteen miles from each, we had stopped at Driver's Drift. At this place we interrogated the landlord as to the existence of leprosy in his district, and he assured us that he knew of none. He summoned, to give me information, an old Kaffir, the head of a kraal, who, he said, knew more of the district than anyone else. This old man, with whom we had a long conversation, assured us that he had never heard of any lepers there. He said that the natives had no name for it except "Lazarus," and he graphically described it as cutting off the fingers and toes. We learnt the next day from Dr. Park that this man's kraal was the worst focus of leprosy that he had in his district, and that the old man knew all about them, some of them being indeed his own relatives. When we returned the next day attended by a magistrate and a policeman, the old man had to produce the patients of whose existence he had professed ignorance. I mention this to show how untrustworthy are many statements made with apparent truthfulness.

Amongst the statements made to me by Dr. Park were the following:—He had been much impressed by the fact that it is exceedingly rare to see both husband and wife affected. He had known the disease to prevail in a family, or in a kraal, repeatedly, but he had never seen it in husband and wife excepting in two instances. He was convinced that it was communicable, but thought the communication must be in some very peculiar manner. He had, contrary to general experience, met with as many cases in females as in males. He thought that sixty per cent. were females. At least three-fourths of the total were, he thought, of the nerve type. (He did not show us a single one which in the least approached the tubercular.)

In consequence of Dr. Park's statement that many females suffered, it occurred to me that probably many of his patients had been young. It is, of course, amongst the young especially that the disease is prone to spread by personal communication, whilst adults may more likely obtain it by fish-food. We turned to his list and found that this supposition derived some confirmation from it. His earliest list mentioned only adults and chiefly men; whilst of a later one, out of 101 cases twenty-eight were under the age of twenty-one. The youngest patient was a child of three, both of whose parents were lepers.

Case A.—The first patient whom we saw at Driver's Drift was a Kaffir woman, who came across the veldt carrying a year-old infant on her back. Both child and mother looked perfectly well. She was a Tembu by birth, but had lived as a nursemaid in Cape Colony. She was probably about thirty-five, and believed that she had suffered from the disease for fifteen years. About this there might be some doubt, for she did not know how long she had had the eruption, which was, for us, the one characteristic symptom. What she recognised as the beginning was swelling of her feet and legs. She had two children, and both of them, as well as her husband, were as yet quite healthy. The only prominent symptom which this woman presented was the existence of a most extensive and very accurately symmetrical eruption. It covered her trunk and limbs with light yellow, abruptly margined patches which did not show the slightest thickening. They were present on her face, but so inconspicuous that they had to be looked for. She had no mutilation, but felt her extremities somewhat numb, and on inspecting the soles of her feet we found cracks and fissures which were insensitive. Her ulnar nerves were thickened, but not in any great degree. The alæ nasi were perhaps thicker than normal, but there was no obvious disfiguration of the face.

Thus we have a most marked example of the symmetrical macular type with no doubt some peripheral neuritis. The case was of indefinite duration. The patient remained in good health. As to source, nothing definite could be ascertained. The woman alleged that none of her relatives had been lepers, and that she had never seen a leper. She had, however, been born in a kraal near to a leprosy focus, and she had herself in youth lived some years in Cape Colony, where she might have eaten infected fish.

From this case we passed to another side of the hill about half a mile distant. Here we saw two sisters, both severely mutilated. They were the daughters of a man who had been under Dr. Park's observation as an example of tubercular leprosy in a severe form, and who had died about two years ago. I was about to assume that it was an instance of communication from father to children or of hereditary transmission, when the aspect of the facts was changed by the assurance that one of the girls had shown symptoms several years before her father. In his family four children out of seven became leprous almost at the same time as their father, the eldest girl taking precedence by about two years. One of the four children was dead; one, whose symptoms although definite were not urgent, had gone away to work and we could not see him. The two remaining ones were before us. Their mother and three of their brothers and sisters had remained well. The mother was dead and all the children were married.

Case B.—The elder of the two sisters attributed her disease to having, whilst living in Cape Colony, slept in the same hut with a leper. She was then about fifteen, and lived with her parents and the rest of the family in the Colony. Several of her brothers and sisters were born in the Colony (Molteno district, Stainsbury). This patient had both her hands and feet much mutilated, symmetrically so. She could walk fairly well—her soles being numb—in spite of ulcerated fissures in the thickened skin. Her trunk and limbs showed many large but somewhat indistinct patches of yellow discoloration. These were arranged with symmetry. Her alæ nasi were somewhat thick, but face not disfigured. She was plump and in excellent health. Her hands were soundly healed. There were scars on her forearms.

Case C.—The younger sister of the preceding was yet more severely mutilated. Her feet had both been lost through the tarsus, one of them still presenting a large unhealed sore. Her mutilations were symmetrical. Her nose was sunken and the alæ thick, otherwise her face was not disfigured. There were scars of ulcers on both forearms and legs. On her trunk the patches of yellow discoloration were so indistinct that it might have been disputed whether they were present. They were symmetrical. The evidence as to dates made it clear that these sisters had suffered from leprosy for seventeen and nineteeen years respectively. In both the disease had for long —with the exception of sores on the feet—been in quiescence. Their hands were sound and could be freely used, and the skin eruption was very faintly marked. Both were in excellent health. It may be doubted whether persisting sores on the feet are any proof of persistent activity of disease. Such sores are secondary to the nerve lesions and prove only that the latter have not been repaired. They are also much influenced by local irritation from walking.

Case D.—The last of the four cases shown to me by Dr. Park was a boy, probably eleven years of age. He was covered by a conspicuous eruption of well-margined large yellow patches. His little fingers were somewhat contracted, but he had no mutilations. His ulnar nerves were very thick (quite fusiform) and his ulnar muscles were atrophied. He had sores on his feet and legs and Hebra's buboes in both groins. The yellow patches were present on the face, and here some slight thickening of their edges could be detected. Both hands and feet were, as far as could be estimated, very numb. This boy was the illegitimate son of a woman who was healthy, but whose mother had died a leper. His father was believed to be well. He was living in a hut with others who were free, but Dr. Park told us that in closely adjacent kraals there were no fewer than five other lepers. Thus the precise source of his acquisition need not be specially sought. There were many probabilities. One of his uncles was in Emjanyana asylum.

Leprosy in Egypt.

I may, perhaps, have written in a former page as regards the reduced prevalence of leprosy in Egypt more strongly than the facts warrant. Several correspondents have assured me that there is still a good deal of leprosy to be found in that country. They all agree, however, in the statement that there is enough of eating of bad fish to account for the persistence of the disease. Thus any correction of my statements which may be required will have no bearing upon the argument. The conditions in Egypt have always been and still are such as fit well with the fish-hypothesis. The only question in debate is as to the extent to which the disease has declined in face of the entire neglect of segregation precautions. There is no doubt that the disease is not obtrusively present. Cases have to be sought for. I have been assured by several persons who have resided there and had good opportunities for observation, that they did not believe that there was any. Zambuco Pasha records the same experience, and says that he had been assured by medical men who were in practice in Cairo and Alexandria that they knew of no leprosy. Yet on investigation, he found a certain number of cases. A recent report on the subject, moreover, published by Dr. F. Engel, gives us precise information. He estimates the total number as little more than 2,000, and admits that it is very small as compared with Crete, or even with Sicily and Portugal. Had the ratio to population equalled that found in Crete, he estimates that there ought to be 18,000.

Dr. Engel has the following instructive paragraph :—

"We found lepers engaged in all sorts of trades; they were even teachers, sheikhs, vegetable and sweetmeat dealers and fishmongers, cigarette, water, and milk sellers; and this we found in the most frequented places. If at first it appears incomprehensible that the disease has not spread more in Egypt by such means, we have only to remember the well-known fact that even in a more intimate way of living, as happens between husband, wife and children, the transmission of the disease from one to another rarely happens."

There can be no dispute that we have in Egypt an instance of steady decline of the disease, in spite of absence of precautions, and of its occurrence at the present time scattered widely over a large area without the formation of foci of prevalence anywhere.*

Leprosy in Palestine and Syria.

The evidence respecting the Palestine district, given by Dr. Langerhaus, agrees well with that in the College of Physicians' report. The following items are taken from the latter. "The disease is evidently all but extinct in this region, *so poor in fish.*" Mr. Finn, Her Majesty's Consul at Jerusalem (not a medical man), reports that it is found only in the native population—Mahommedans—with rare exceptions. There was, at the time of his report, a single case, in which the subject was a Jew (a boy). He states that the leper huts accommodate about a dozen, and I gather, although it is not expressly stated so, that this number includes most of the lepers now in Jerusalem. A few lepers are stated to be found at Nablus and Jaffa.

Mr. Sandwith, Vice-Consul at Caiffa, reports that there have been within his knowledge but three cases of leprosy in his district, which includes the towns of Tiberias, Safed, and Nazareth. They all occurred in one family in Caiffa, and consisted of, first, a woman who died of the disease at forty years of age; her brother, who is in a leper house in Damascus; and her son. Her husband and another son are healthy. No provision is made for the disease in that part of the country, since, adds Mr. Sandwith, "it is hardly known."

---

* "Most ancient writers seem to consider the Nile the cradle of leprosy. It was therefore surprising to be told by inhabitants and medical men in Alexandria and Cairo that there was no leprosy in those places."—Journal of Leprosy Investigation Committee, 1892.

Dr. Makern (*Lancet*) writes: "I may add that leprosy is rare in Egypt."

LEPROSY IN HAUSALAND. (SOKOTO, CENTRAL SUDAN.)

The following extract was supplied to me by Mr. E. H. Hare.

Extract from "Hausaland," by C. H. Robinson. (Sampson, Low & Co.) 1895. P. 151:—

"One of the questions we asked every (leprosy) patient who came to see us was: 'Is there any article of food which you have given up eating since you became a leper?' In quite half the cases examined, the answer which we received was: 'Yes, I have given up eating fish.' In many instances they added some other article of diet, but the consensus of opinion in regard to fish greatly preponderated. When asked why, they stated they considered fish bad for lepers. On tho coast and in the neighbourhood of Lake Tchad there is respectively 'practically no leprosy,' and leprosy is 'comparatively rare.' In Kano (the commercial capital of Hausaland, and some 450 miles inland), it is distressingly common, as in other places where little fish is to be had. In the former places any fish consumed would be fresh, in the latter very likely putrid, thus fitting in to the theory of a fish origin of leprosy."

SIBERIAN LEPERS.

Mr. Hawes gives us the following as to leprosy:—

"Salted fish forms the staple food of the natives and poor Russians. To lack of variety, the absence of vegetables, which will not grow in Nikolaevesk, and the unhealthy conditions of living, must be attributed the leprosy among the Russians on the Amir. A few years back there was no accommodation for these lepers, and many suffered from want of food, or lay untended, but now there is a properly constructed leper house two or three miles from Nikolaevesk."—Page 62.

"At Nikolaevesk meat is dear and vegetables scarce, therefore salt fish and black bread form the staple diet of the criminals. Owing to the absence of transport during the winter, the accumulation of provisions results sometimes in the fish being a year old before it is consumed."—Hawes, page 69.

Nikolaevesk is on the mainland, opposite the northern end of Sakhalin, and is directly north of Vladivostok. The one is on the Okhotsk Sea and the other on the Sea of Japan.

LEPROSY AND FISH-EATING IN BURMA.

From "Crawford's Embassy to the Court of Ava,"* published in 1834. Vol. I., p. 17:—

"Our servants brought us from tho market a supply of fresh fish, among which was the cockup, although we could not be less now than a hundred and twenty miles from the sea; and this is considered a fish of salt water only. Fish in various forms, and of every species, without exception, which the country affords, form an essential portion of the food of all classes of the Burmans. The Irawadi and its branches afford an abundant supply, not only of ordinary kinds, but of several delicate varieties. Besides the cockup, one of the best Indian fishes, there is to be found at Rangoon an abundance of mango fish from April to September, and what is called whiting in Calcutta, the rohu and the katla, with the mullet and abundance of prawns at all seasons. In some parts of the river the sable, the richest fish of India, is to be found, but not in abundance; or, more probably, the art of taking it is not understood by the Burmese fishermen."

---

* The name Ava means "fishpond." Ava was tho old capital of Burma.

On p. 47 it is stated that:—

"Fish are universally destroyed without scruple. The Burmans could not live without fish; therefore, there is a general dispensation for destroying them."

"Crawford's Embassy to Ava." Vol. I., p. 433, *et seq.*:—

"In our ride this morning Mr. Chester and I visited a village of lepers, consisting of about twenty houses. Many of the inhabitants were out begging at a considerable distance about Ava, where rice was said to be somewhat cheaper than in the town itself, and therefore charity more easily practised. About one half of the inhabitants of this hamlet, we were told, were affected with the malady. The disease, which the Burmans call 'anú,' is very frequent in the country. It is the *Lepra Arabum*, or Elephantiasis. We examined several persons suffering under it. The lepers described the complaint as commencing with a white spot, generally on their thighs or arms. The chief seats of the disorder are the hands and fingers and the feet and toes; but other parts of the body are not exempt, and it occasionally attacks the bones of the nose. The parts affected have a livid look and a mottled appearance, produced by the cicatrices of the nose. When it attacks the fingers and toes, it destroys the joints and nails and distorts them. The open sores are not numerous, are generally superficial, and upon the whole the appearance of the patients, in ordinary cases, is by no means so offensive as might be expected, nor was there anything disagreeable in their residence to distinguish it from an ordinary village. The affected part, from the description of the lepers themselves, seems to be nearly dead and insensible. They stated that they had no pain when not obliged to move, and that their rest was not disturbed. The disorder, probably, does not much contribute to shorten life, for I have often seen very old persons labouring under it. One of those whom we examined to-day was a woman, apparently seventy, a captive brought from Aracan, and she said that the disorder broke out when she was a girl of fourteen years of age, and that she had been a martyr to it ever since. Leprosy, according to the Burmans, is not contagious, but in rare cases it may be communicated by actual contact. Even this much, however, is probably not correct; for sound children may be seen at the breast of leprous women, and we ourselves saw abundant examples of sound women married to leprous husbands, and sound children the offspring of leprous parents. We were particularly struck by one little girl about three years of age, in perfect health, clinging close to her father, who was begging by the roadside, and who was a great martyr to the disorder. That the complaint, however, is frequently hereditary, and may be communicated by parents to their offspring, seems to be generally admitted. Like scrofula and gout, however, it is said to disappear for one or two generations, and to break out in the third or fourth. Like these also, it affects some members of a family and not others. The disorder, although generally incurable, is not always so. We saw several persons in the village above-mentioned, who, by their own account, had recovered from it, and upon whose persons its scars were still visible.

"It would be difficult, I imagine, to trace this disorder to anything peculiar in the climate, the food, or the habits of the people. It occurs in the moist climate of Rangoon and the drier climate of Ava; and, generally speaking, the country throughout is healthy. The effectual price of labour is high, and consequently the Burman peasantry are, upon the whole, well fed, clad, and housed. For an Asiatic people, they are an active and athletic race, remarkably free from bodily infirmities; but, above all, they are free from diseases of the skin to so remarkable a degree, as to strike every stranger who has observed them. With respect to the frequency of leprosy amongst them, it ought, however, to be observed that a stranger who has visited only the principal towns may easily be deceived and led to consider it greater than it really is, owing to the circumstance of the lepers naturally coming to the vicinity of these for the facility of getting charity. A number of those whom we examined this morning were certainly natives of distant parts of the country.

"The Burman leprosy appears to be the same with the worst form of that disease among the Jews; and also with the leprosy of the middle ages in Europe; and it is singular how nearly alike is the treatment of the unfortunate persons labouring under it, and the prejudices which exist in regard to the subject. Among the Burmans, lepers are held to be unclean, they are expelled from society, and compelled to live in separate villages, which may be considered as so many lazarettos. The Burmans, however, go much farther than either the Jews or our European ancestors. The lepers themselves are not only expelled from society, but the interdict extends hereditarily, and for ever, to their descendants, who are considered as outcasts, ranking with the burners of the dead, or chandalas, and other impure classes. A leper, or the child of a leper, can only marry with another leper, or the descendant of a leper. When a candidate presents himself for ordination to the priesthood, he is made to swear that he has no taint of leprosy, and even a priest who is detected with the disorder is expelled forthwith from the monastery. The bodies of all respectable Burmans are burnt, and not interred. This rite is denied to the lepers, who can be buried only, or, as we would express it in our own case, they are 'refused Christian burial.' Leprosy also is considered a sufficient cause for the dissolution of marriages. A leprous wife would be immediately repudiated by her husband, and a wife will part without scruple from a husband who is affected with the disorder.

Money, however, which can effect wonders among the Burmans, will purchase an exemption for the wealthy; and the penalties, of course, fall chiefly on the poor. This, however, in persons of all ranks, becomes, like almost every other, a subject of the grossest abuse, by affording to the public officers grounds for extortion. A wealthy leper has to pay large sums to the Government and its minions for the privilege of not being expelled from society. A person without influence, of respectable character, having the scar of a sore of any kind, is liable to be seized by the officers of the arawun, or "superintendent of outcasts," under pretext of being affected with the leprosy. To avoid the scandal of a public examination, or the risk of being driven from society, they are obliged to pay heavy contributions. It was but two days ago that a case of this kind occurred at Sagaing. An old woman, with the recent scar of a common boil upon her hand, was seized by one of the petty constables of the arawun, and to avoid being dragged before the tribunal of that chief, a heavy fine was extracted from her. The leprosy, as well as every other physical evil, is considered by the Burmans as an infliction for some crime or transgression in some former state of existence. I believe that adultery is the particular offence for which leprosy is the supposed punishment."

Fish Food in Japan.

Captain St. John, writing of Japan, states "All the eastern nations are great fish-eaters, and the Japanese are no exception to this general rule. The sea adjoining their coasts abounds in excellent fish; the quality improves the further north you go, and as the temperature of the water decreases. They begin with the whale,* as I have before mentioned. The tunny comes next in size. Quantities of this great coarse fish are caught on the Kii coast, and from thence sent to all the large towns, where it is exposed for sale, and looks as tempting as whale's flesh! Bonite are caught in great numbers and eaten in many ways. Salmon, however, is the most universally used fish in the country. The Japanese are exceedingly fond of whale's flesh, which they eat in the most disgusting state of putridity."

Missionary Diet in Japan.

It is unfortunately not very uncommon for missionaries to contract leprosy. They often conform too closely to the dietic habits of the district. The following quotation from a lady engaged in mission work in Japan may be of interest:—

---

* See Captain St. John's work, p. 188. The whale, as doubtless the author knows, is not a fish, but a mammal which has taken to the water.

"I can manage a Japanese diet better than many of the missionaries, yet even I am glad to get to a Japanese home where there may be a chance of getting an omelette or fried fish. How would you like to be put for a week, as we were at Minato, with a breakfast each morning of a little bowl of hot water, half thickened with corn-starch, and small pieces of a kind of white bean curd in it (very slimy), *a little plate of coarse half-cooked fish*, almost like tough meat in consistency, with some brown sauce over it, a little pickle, and your rice-bowl?"

SIAM.

The Rev. George Elder, of Blackheath, has sent me the following extract from a letter written by his son, now resident in Northern Siam. After stating that "leprosy is very prevalent," he proceeds:—

"These people eat rotten fish. They do not care for it unless it is rotten, so I suppose that is the cause of their leprosy. The very smell of the stuff they eat is enough to make one sick."

INDIAN ARCHIPELAGO (MR. CANTLIE'S PRIZE ESSAY).

"The Netherlands Minister for the Colonies wrote:—

"The disease appears in all parts of the Indian Archipelago except the little Sunda Islands and the northern part of Celebes.'

"Mr. Skertchley, who to some degree contests this statement, and says that it is 'unfair to stamp an island as leprous because a leper has been seen there,' yet admits that 'it is only too true that the disease is very widespread, and the Straits Settlements, Java, Sumatra, the Moluccas, and most of Celebes are leprous, and Borneo also to a lesser extent.'"

The following is the heading to one of Mr. Cantlie's chapters:—

"East Indian Netherlands. 'Leprosy prevalent, but decreasing. No distinctions of race; not contagious. Molucoas most infected. No leprosy in North Celebes or Sunda Islands.'"

THE SALT TAX IN CHINA.

The following is quoted from John Francis Davis's "Description of the Empire of China." 1836. (Vol. II., p. 403.)

"Another principal source of revenue in China, next to the land-tax, is the duty on salt, which yields a very large amount in consequence of the immense consumption of salted fish, as well as other provisions. The trade in salt is a government monopoly, farmed by a certain number of licensed merchants, who, in point of wealth, vie with those other monopolists, the Hong merchants of Canton. This necessary of life is chiefly procured in the eastern and southern provinces on the coast, though they appear to have mines of rock-salt, as well as salt-springs. Large square fields in the marshes adjoining the sea are made perfectly level, with elevated margins. The sea-water is then either let in by sluices, or pumped in by the method commonly used in irrigation. The water, which lies on the surface to the depth of a few inches, is then evaporated by the heat of the sun. The huge stacks, or rather *hills*, of salt, observed by our embassies at Tien-tsin, were calculated by Mr. Barrow to contain six hundred million pounds, and occupied the north side of the river, or that opposite to the grain-junks; but these lay *above* the city, while the heaps of salt-bags lay *below* it on the river. We find from Marco Polo that a like revenue was derived by the Mongol Emperors from this necessary of life.

"In China no considerable quantity of salt can ever be removed except by a permit."

JAVA AND EAST INDIAN NETHERLANDS.

Of *Java*, Mr. Cantlie quotes from Dr. M. Albricht:—

"Fish is held to be a cause of leprosy; lobster and the roe of several fish are maintained to cause leprous infection." The fish from the island of Madura, opposite the town Sourabaya, is held to be deleterious. Segregation is practised much more efficiently than in Norway. "The moment leprosy declares itself the leper is expelled the town or village. A hut is built for him, and his friends take food to him regularly. The food is taken on a leaf and deposited at the door, and the friend departs quickly in fear of infection."

Mr. Cantlie further continues the quotation:—

"Formerly, that is up to 1865, there were fourteen leper hospitals in the Netherlands East Indies, but as the disease was neither very prevalent, nor considered contagious, they were gradually abolished, until in 1886 there were only six, and now only four, all voluntary establishments. Dr. J. van Deventer distinctly says: 'The number of sufferers (in Java) being always very small.'"

Writing of the East Indian Netherlands, Consul McLachan states in reply to Mr. Cantlie's question as to:—

Segregation.—Yes, up to 1865, when the Government, from experience, rescinded the regulations.

Establishments.—Fourteen hospitals up to 1865, eight then gradually abolished, six still (1886) serve as voluntary asylums for lepers. In 1883 there were 189 inmates.

He adds the following as an abstract of replies from the medical department:—

Occurrence.—Affects natives and Europeans; the latter not till after two years' residence.

Age.—Leprosy may appear at any age from childhood upwards.

Race.—Equally among Europeans, natives, Arabs, and Chinese.

Conditions.—Commoner on the seaboards than in the mountain ranges. Drunkenness and want aggravate the disease.

Heredity.—Lepers always produce healthy children; but these sometimes have become leprous in after years.

Contagion.—"Not one case ever recorded."

Here we have important evidence of the decline of the disease, notwithstanding the neglect of segregation and the closure of the homes (voluntary).

NOTES RELATING TO CONTAGION.

BELIEF IN CONTAGION SAID TO BE DYING OUT IN NORWAY IN 1873

In a review of Gavin Milroy's Report on Leprosy and Yaws in the West Indies, and V. H. Carter's Report on Leprosy and Leper Asylums in Norway in the *British and Foreign Medico-Chirurgical Review*, vol. lv., 1875, it is stated that the belief in the contagiousness of leprosy was once universal, and it was solely this belief that led in the first instance to the formation of leper hospitals. The reviewer goes on to say: "The belief in its contagiousness has been dying out. The accounts collected by the College of Physicians, by Dr. Milroy in the West Indies, by Danielssen and Boeck, all point this way. There are scarcely any trustworthy instances of contagion. They are indeed numerous enough, but they do not bear rigorous investigation. . . . . The concurrent opinion of many ages has pointed to rotten fish and salted provisions as favouring the production of leprosy, and Dr. Milroy, after personal observation in the West Indies, and Mr. Hutchinson, are inclined to attribute a great deal to decayed fish as an article of diet."

THE COLLEGE OF PHYSICIANS ON CONTAGION.

"The all but unanimous conviction of the most experienced observers in different parts of the world is quite opposed to the belief that leprosy is contagious or communicable by proximity or contact. . . . The few instances which have been reported in a contrary sense either rest on imperfect observations, or they are recorded with so little attention to the necessary details as not to affect the above conclusion."

OPINIONS AS TO CONTAGION.

The distinguished pioneers in the scientific study of the disease, Drs. Danielssen and Boeck of Norway, recorded their opinion in the most explicit terms that no facts in that country favoured the idea of contagion. The same opinion was expressed by many others. Dr. Hirsch, the indefatigable author of the "Geographical Distribution of Disease," after a critical summary of the evidence from all parts of the world, recorded, his conviction that "there is not a single fact which tells decisively and indisputably for the conveyance of the disease by contagion. On the other hand, the facts are very materially against the notion, inasmuch as they entirely fail to accord with our whole experience of the mode of diffusion of the truly contagious diseases.

OPINIONS OF AUTHORITIES AS TO DE NOVO ORIGIN OF LEPROSY.

Hirsch, who denies contagion and attaches much importance to heredity, writes:—

> "There cannot be the slightest doubt that the disease has developed in the past, and still develops, solely under the influence of the proper patheogenitive factor, and quite apart from special congenital predisposition. He adds that the literature furnishes also a few cases in which leprosy has shown itself, in regions where the disease, as an epidemic, has been extinct for centuries."

He gives a considerable list of references.

See Ext., Book I., pp. 45, 75, 143, 175.

Surgeon-General Francis, late Professor of Medicine, Calcutta, writes: "Firmly believing as I do that leprosy may be produced *de novo*."

The Report from the Tarntaran Asylum says, of 118 cases, in 71 it was definitely affirmed that no traces of the disease existed in the locality.

Dr. Duhring (in 1891) found four lepers in the General Hospital at San Remo. They were not wholly segregated. In no case did the patients know of leprous relatives or of any exposure to contagion. They were all Italians, but three of them had resided for long periods in the South of France before the disease showed itself. All were adults, two men and two women, and all were Roman Catholics.

Dr. Numa Rat, an excellent observer, writing from the West Indies (Anguilla) mentions four deaths during three years, and says that four adult lepers were living in the island who had been subjects of the disease for from twenty-five to thirty-five years.

He bears the following remarkable testimony :—

> "The histories of these lepers correspond with those of almost all the other lepers whose cases I have studied, and they serve to show what is generally, and very nearly always, to be found in regard to leprosy : that a leper's parents were not affected with the disease, that he is the only one of a probably large family who has been so afflicted, that none of his children have become leprous, and that his wife has not contracted the disease from him. He appears to have been singled out of a large number of persons by the disease, and he has lived in the closest intimacy with many without communicating it to any of them. It must be a remarkable disease which is characterised by such peculiarities. It behaves very differently from those diseases in which heredity and contagion are recognised."

Respecting India, the Commissioners wrote, p. 291 :—

> "The native leper, in an overwhelming majority of instances, offers no suggestion as to the contraction of the disease; denies that he has ever had any contact or intercourse with lepers, and simply accuses fate."

Various Extracts relating to Fish-Eating.

"A curious practice has prevailed in the Talpaiguri district for generations past of storing fish during the rains in large open-mouthed vessels for consumption as a staple article of food during the winter. The odour of this preparation is almost unbearable to those not accustomed to it, and every now and then we receive complaints on the subject. A similar practice exists in Burmah and other places."—From I.M.O., November, 1888, p. 342.

Fish-Eating in the Laga Hills.

Assistant-Surgeon Chunder Bhuttacharjee, in the *Indian Medical Gazette*, January 1st, 1869, has a paper on the prevailing diseases in the Angami-Laga Hills. He does not mention leprosy, but he states that the Lagas habitually eat decomposing animal food of all kinds. Respecting fish, he says: "Fish they seldom get, but when they do it is always decomposed. Having no other weapons to catch them they kill them with a species of vegetable poison which becomes a powerful ferment in the dead fish. A few hours are sufficient to produce decomposition. There are few animals in nature which a Laga does not eat with relish, and it is said by them that decomposed fish and meat taste better than fresh ones."

PREFERENCE FOR STALE FISH.

It may seem a strange thing to say, but it is true that to some palates rotten fish is preferable to fresh fish. This preference, incredible as it may seem to some, is probably of the utmost importance in explaining the prevalence of leprosy in certain races and its occurrence in certain individuals. This preference may sometimes be a family or even a personal peculiarity, and may be the cause of leprosy in districts in which the disease is comparatively unknown.

EXTRACTS FROM "THE HERRING: ITS NATURAL HISTORY AND NATIONAL IMPORTANCE." BY JOHN M. MITCHELL.

"When August has ended, take shipping or ride,
Ling, salt-fish, or herring, for Lent to provide.
To buy it at first, as it cometh to road,
Shall pay for thy charge, as thou spendest abroad.

"Chuse skillfully salt-fish, not burnt at the stone,
But such as be food, or else let it alone.
Get home that is bought, and go stack it up dry,
With pease-straw between it the safer to lie."

Chronological History of the Herring Fishery.

Among the savage nations of the present time we find that fish generally forms part of their ordinary food, and this even where the fruits of the earth are abundant; we may therefore conclude that, in the northern countries, the natives on the seashores, in ancient times, must have lived, to a great extent, on fish. Solinus, who wrote about the year 240, says of the inhabitants of the Hebrides, "They do not know the cultivating of grain, and live much on fish and milk." (Page 128.)

How long herrings were used merely by the inhabitants adjoining the lochs and seas where they were caught, and when they became an article of commerce, it is difficult to determine, although it is quite possible that, in ancient times, herrings may have been exported in a dried or smoked state without being salted, yet it is most probable that, until salt was used, the commerce in herrings was inconsiderable; it is worthy of remark, however, that herrings are easily preserved without salt by exposure to the air after being opened, and that the practice is still prevalent in some parts of the North Highlands. (Page 130.)

Swinden, in his "History and Antiquities of Great Yarmouth," supposes that the herring fishery commenced there soon after the landing of Cedric the Saxon in 495; and states that the Church of St. Bennet was built upon the Greenhill, "and a godly man placed in it, to pray for the health and success of the fishermen that came to fish at Yarmouth in the herring season." (Page 131.)

In 988—993 there was such an abundance (of herrings) that all the maritime districts of Norway "were filled with them." (Page 132.)

The word "dry" almost implies that the herrings were dried for sale, and not smoked; if the herrings had been salted, the packages or barrels would likely have been mentioned, or subjected to a toll or tax. (Page 133.)

Mention is made of the inhabitants of Lümfiord, in Denmark carrying on commerce with Bremen for salt in 1054. (Page 133.)

"The Danes, formerly clad like simple seamen, are now clad in scarlet and purple, and every nation carries them abundance of gold and silver in exchange for their herrings." (Arnoldus de Lubeck.)

In the Danish Sound, we are told, great quantities were caught in the fall of the year 1080.

"There are 40,000 vessels, each having at least six persons, to fish, besides 500 vessels for gutting and packing, and there are more than 300,000 men who do nothing but fish herrings." (Philip de Mazieres.)

In 1124 we read that herrings were so abundant on the coasts of Pomerania that a horse-load was given for one ore, a coin of about the value of three-farthings. (Page 134.)

Some writers state that William Beukely, or Beukelsen, born at Biervliet, in Brabant, was the first person who invented the art of salting or pickling herrings. The historians differ as to the time and place of his birth: some say 1347, others 1397. (Page 134.)

It is not difficult to prove however, that herrings were salted long before that period; for besides the instances already given, we find a law was made at Niewport exempting salt herrings from paying duty on account of the salt and barrels used in pickling, long previous to Beukelsen's pretended invention.

Sixty foreign vessels, ten of which were from Lombardy, entered Yarmouth harbour for the purpose of procuring herrings, within the five days from the 28th September to 3rd October, 1344. (Swindon).

John Lackland confirmed in 1202 by charter a donation of herrings to the Abbey of Connal. (Bodl. MSS.)

In 1424 herrings were regularly salted and barrelled as well as smoked. (Page 141.)

"France, Flanders, sundry flotis, passand in the time of Lentrown throu the seis Mediterrane aye selland thair fische to thair grit proffit and winning." (Bellenden's Boece's Cosmographie of Albion.)

Red herrings seem to have been also in general use in England about the same time. We read that on Maunday Thursday, Cardinal Wolsey washed and kissed the feet of fifty poor people, gave each twelve pence, three ells of good canvas for shirts, a pair of shoes, and a cask of red herrings. (Howitt's Visits.)

In October, 1609, King James VI. issued a proclamation prohibiting foreigners from fishing on the coasts of Great Britain, and, accordingly, the following year the Dutch made a treaty with him agreeing to pay for liberty to fish in the British seas.

The King's household in 1613 was supplied annually with 1,500 cods and sixty barrels of white herrings of the best brand, at the price of 13*s.* 4*d.*

" All herrings and salmon for export be made, pined, and cured with French Bay or Spanish salt, or with salt upon salt, made of foreign salt." (From Act anent the loyal curing and packing of herrings and salmon fish. 1693.)

An Act of 1704 prohibits the curing of fish with Scotch salt and the importation of English or Irish salt, and ratifies all privileges and immunities granted by former Acts.

Although the English rock salt was found necessary for the purpose of being used to cure the herrings, it was then not allowed to be imported into Scotland. (1794; page 223.)

Herrings not to be deemed gutted under the statute, unless gutted, cured, and packed within twenty-four hours after being taken, and to lie fifteen days in salt before being entitled to brand. (Act of 1815.)

So great is the vigilance now exercised in England, and such is the public sentiment as to its importance, that two poor street hawkers were sent to prison and hard labour for a month during the Christmas of 1904 for merely offering for sale fish in bad condition.

NGAPEE IN BURMAH.

Colonel Yule states that during the twelve months November 1854 to November 1855, 13,500 tons of Ngapee passed through the custom house of Thayemayo as export from British to independent Burmah.

> "It is the Balachony of the Malays and the Kapee of Siam. Putrescent fish of some shape or other is a characteristic article of diet among all these races from the mountains of Sythet to the isles of the Archipelago."—Colonel Yule, quoted by Lewis and Cunningham.

FISH AND FISHERIES.

Dr. Albert Ashmead, who was formerly a strong advocate for contagion, has recently written as follows:—

> "Now, wherever leprosy exists to-day, either endemically or epidemically (I do not mean sporadically, but where it has taken root), fish is the staple article of food of the people; they eat meat rarely or not at all. In Japan, where this is especially true (for Buddhism prevents the killing of animals), there are 100,000 known lepers. In fish-eating India there have been counted 250,000 lepers; in the fish-eating southern provinces of China 150,000 lepers are known to exist; while in North China, where meat is eaten instead of fish, there is no leprosy unless imported. As regards Iceland, particularly on the coast of Offord, fish is the most important article of diet, and here there are lepers galore."

Extracts from "The British Fish Trade," by His Excellency Spencer Walpole. "Fisheries Exhibition Literature," Vol. I., p. 22:—

> "Cornish pilchards find their principal market in Italy; while the cod and ling, which are caught chiefly in the Shetland Islands and Northern Scotland,

are sold in Spain. . . . It is said in northern Scotland that the trade between Spain and the Shetland Isles in dried fish has existed since the reign of Elizabeth. Some vessels of the great Armada were wrecked in the Shetlands and their crews forced to remain there for many months, and, during their residence, they formed relations with the inhabitants which, after an interval of nearly three centuries, are still maintained by their descendants. About 4,000,000 cod and ling are annually caught by Scotch fishermen; the catch produces about 150,000, cwt. of cured fish, and rather more than half of the whole are exported from Scotland."

Page 23:—

"The curing of pilchards is not carried on with much care. The fish are piled on the stone floors of the curing houses in masses five or six feet high, each layer of fish being covered with salt. The 'bulk,' as it is termed, is thus left piled up for a month. During this period the weight of the mass forces the oil out of the fish, and this oil is run into cisterns and is used by the poor of Cornwall for lighting purposes. At the end of the month the fish are taken from the bulk and packed in hogsheads." The writer remarks that though so little care is exercised by the curer of pilchards, far different is the course pursued with Scotch herrings. Early in the century these were bought by the slave-owners of the West Indies as a cheap food for their slaves. The abolition of slavery destroyed the trade. He further adds that Ireland "continued to purchase large quantities of herrings till after the famine of 1847. The poverty of the people in the first instance, and the rapid decrease of the population afterwards, terminated the Irish demand; and Ireland, instead of taking 100,000 or even 180,000 barrels of herrings a year, now only purchases about 20,000 barrels annually."

Vol. I., "Fisheries Exhibition Literature," p. 382. Mr. Stephen Mitchell, M.A., writing upon the use of fish in other countries at the present time, remarks:—

"At the present day fish forms a very large element in the diet of many nations and tribes. So largely is fish eaten in China that the home supply is not sufficient, and vast numbers of the population find employment in obtaining it from other countries. One of the chief imports is the bêche-de-mer, or trepany, a species of sea-slug, much prized as a delicacy by the Chinese *gourmets*. Fiji and the islands of Polynesia furnish the largest quantities, and from them also there is a steady supply of dried sharks' fins, which are regarded as especially nourishing on account of the great amount of gelatinous matter they contain. The great salmon fisheries of Mezo, so well described by Miss Bird, find a ready market in China, but for some reason not wholly for home consumption, as several million pounds of dried or preserved salmon are exported every year. Throughout China the millions who form the population dwelling entirely on boats or rafts on the rivers and canals, find their chief sustenance in fish or water-fowl. The tribes of Beloochistan feed almost entirely upon fish, and fish boiled or dried is even given to the cattle during times of scarcity. Tartar tribes of Siberia and central Asia, the

Esquimaux, Coreans, Greenlanders, the coast tribes of North America, and the Indian races of both North and South America, as well as some of the aboriginal tribes of Australia and New Zealand, live almost entirely upon fish diet. In some cases it is consumed in a raw state, as in Hawaii, where a meal is thus described by M. Ruschenberger: 'The earth floor was covered with mats, and groups of men squatted in a circle, with gourd plates before them. They ate of the raw fish, occasionally sopping the torn animal in salt water as a sauce, then sucking it.' The diet of the inhabitants of New Guinea is described by Admiral Moresby as consisting of 'Roots, fruits of trees, vegetables, etc., but chiefly fish caught in holes in the bed of the river.' Again: 'Fish of all sorts are everywhere so plentiful along the shore that they may be caught with the greatest ease in uncommon abundance.'"

INDIAN STATISTICS.

BOMBAY (THE MATUNGA ASYLUM).

No European has ever been admitted as a leper into the Matunga Asylum, and only one Parsi (a woman from Surat). The great bulk of the patients have been Hindus. A statistical table, given at p. 16 of Mr. Chosky's report, gives percentages of:—

Maratha Hindus	66·43
Low Caste Hindus	13·41
Mahomedans	9·32
Christians	10·61

As to sex, males have afforded about 68 per cent. and females 32 per cent.

When I visited this asylum I was told that it might be safely assumed that all its inmates had eaten fish habitually. One man whom I saw, however, denied it with emphasis.

The average annual mortality at the Matunga Asylum has been nearly 20 per cent. of the inmates. It must be remembered that it receives chiefly vagrants and beggars, and that many of these are in a late stage of the disease, and weakened by exposure and poverty.

The subjoined statement is based upon the supposition that each one of the several populations in the Bombay Presidency might supply to the Matunga Asylum 1 per 10,000 of its total numbers. It is open to several fallacies, one of the principal being that Christians are more willing than others to enter the asylum. It is even possible that some may profess themselves Christians subsequent to the development of their leprosy. The excess is, however, three times the average, and thus a considerable margin is allowed for error.

Population.		Calculated Number.	Actual Number.
Hindu	19,916,438	1,991	365
Mussulman	4,567,295	456	45
Jain	535,590	53	0
Native Christians	216,118	21	60

BOMBAY PRESIDENCY: THE LAST CENSUS.

There are 535,950 Jains, and 78,000 Parsis in the Bombay Presidency, 3,000,000 Musulmans and 14,000,000 Hindus.

The native Roman Catholics in the Bombay Presidency bear a proportion in comparison with those in the Anglican communion of nearly nine to one.

The Brahmans in Bombay are four per cent. of the total population, their number being 1,050,000.

In the Census Report (Enthoven), 1902, p. 166, it is stated that "Europeans, Parsis and Jain Vanis show no lepers."

This census was taken after famine years. It showed a great decrease in the number of lepers. They amounted in the whole population to only 2·7 per 10,000. There were in the Matunga Asylum sixty who were registered as Christians. These, taken from a Christian population of 216,118, make nearly 3 per 10,000, and it must be remembered that they by no means comprise all. There are several other asylums, and, further, most lepers prefer to remain at home.

LEPROSY IN THE KONKAN.

Ratnagiri is a British District in the Konkan, or Southern Division of the Bombay Presidency. Population, 1881 = 997,090. The following quotation is from "Hunter's Gazetteer."

> "Ratnagiri is well supplied with sea-water fish, and in a less degree with fresh-water fish. Sardines swarm on the coast at certain seasons in such

abundance as to be used for manure. Women and old men carry fish to market, or hawk them from door to door. The fish are often bartered for grain and firewood, and are largely purchased by wholesale dealers for the purpose of being salted and cured. A considerable quantity of cured fish is exported through the passes of the Sahyádri range into the Deccan. Small fish are cured by being simply dried in the sun."

The prevailing diseases are intermittent fevers and leprosy. There are four dispensaries in the district, and a hospital for lepers.

SALSETTE AND THE THANA DISTRICT.

The Thána or Tanna district of the Bombay Presidency comprises the Island of Salsette, which is separated from the mainland by the Bassain Creek. Its total population in 1881 was 908,584, that of Salsette itself being 108,000. Eighty-nine per cent. of the population are Hindus. Moslems = 4·6 per cent.; Christians = 4·4; the total number of Christians = 39,295, almost the whole being Roman Catholics.

"There is a considerable trade in salt, which comes from Rai Murdha, Bassein, and Urah, and is sent to the Deccan, some on bullock-back, but most by rail. The salt dealers are Mussulmans. Three or four Nenan Mussulmans bring dried fish from Bassein and Uttan-Gorai into Salsette by boat, and send it to the Deccan, some of it on bullock-back, but most of it by rail."—*Bombay Gazetteer.*

According to the 1881 census, amongst Thana "infirmities" there were 749 lepers (males, 515; females, 234), or 23·4 per cent. of the total number of infirm, which were returned as 3,197 (males, 1,787; females, 1,410) persons, or 0·35 per cent. of the population.

The subjoined table shows the religious creeds:—

	HINDUS.		MUSSULMANS.		CHRISTIANS.		OTHERS.		TOTAL.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Lepers.	455	220	18	6	34	4	8	4	515	234

"Sea-fishery in Thana is very productive, so that the fishing castes are able to cure and export to a large extent. The chief traders make a profit of about 6¼ per cent., and the retail dealers about twice as much. Large transactions take place between the fishing and agricultural classes, the former taking salted and dried fish inland and exchanging them for grain."—Hunter, Vol. XIII., 1887.

SALSETTE is a fishing island, and has a considerable Roman Catholic population. During the years 1890 to 1897 it sent 369 lepers into the Matunga Asylum, and no Christians were received from any other part of the Presidency. Of these (369) 237 were men and only 116 women. The remaining 16 were under age, and their sex is not stated. (See Dr. Chosky's Report, p. 17.)

> "During the seventeenth century the conversion of Hindus and the building of churches and monasteries was continued, and the church, especially the Jesuits, grew in wealth and power. In 1673 all the people in Salsette were Christians, and the Bándra Jesuits lived sumptuously, most of Salsette being theirs."—*Bombay Gazetteer*, Vol. XIII., p. 462.

Bishop Heber found Tanna chiefly inhabited by "Roman Catholic Christians, either converted Hindus or Portuguese who have become as black as the natives and assumed all their habits."

The 1881 population returns show that of 108,149 people, 75,624, or 69·92 per cent., were Hindus; 7,036, or 6·50 per cent., Mussulmans; 24,248, or 22·42 per cent., Christians; 948, or 0·87 per cent., Parsis and Jews, 293, or 0·27 per cent.

The details of the Hindu castes are given. Amongst them we find there were: 440 Jains, 321 Khárris (sailors), 284 Bhois (river-fishers), and 104 Nángelàs (fishermen).

THE MATUNGA HOSPITAL, BOMBAY. (MY OWN VISIT.)

The last leper asylum which I visited in India was that of Matunga, a few miles from Bombay. This institution was founded through the zealous efforts of H. A. Acworth, Esq., in the year 1890, and at the time of my visit had 490 inmates. It consists of a number of well-built wards, placed in a really beautiful garden. There is a sewage farm attached, and the lepers are encouraged to work on it and in the garden, certain small payments being made to those who do so. Mr. Acworth, having left India, his place is now taken by Mr. James, who with zealous energy maintains the institution in a high state of efficiency. There is, of course, no actual compulsion, but every effort is made to clear the streets of Bombay of lepers who beg, and once admitted certain impediments to departure are encountered and every inducement offered to remain permanently. The sexes are in separate but closely adjoining wards, and they mix freely in the garden and grounds. Bombay is in the centre of a great fishing district, and its dried fish, which goes by the name of "duck," is a well-known article in most parts of the world. I was told at the outset that there was no object in attempting to inquire of the patients as to their fish-eating habits, since it might be safely assumed that all had eaten it habitually. It was added that the coast district to the south, known as the Koncan, famed for its fisheries, supplied now, as it always had done, a large quota of lepers. The island of Salsette, a home of fishermen, also sent many, almost all the Roman Catholics in the asylum being from that island,

Such being the general facts, there remained no problem to investigate as to fish food, and we contented ourselves with the examination of a few patients selected for us by Dr. Turkard as illustrating points of interest in reference to the malady.

Amongst these were the following. Two children who had the disease, the youngest only four, had both been suckled by mothers who were suffering from leprosy.

Case. A child aged seven was the offspring of a leprous father, its mother having been, it was believed, free. The disease assumed the tubercular form on the cheeks, but the surface of her body showed all over a dappled condition of indefinite white patches without any proof of œdematous swelling. The œdema was confined to the face. The ulnar nerves were definitely enlarged.

The case was of interest as illustrating the form of dermatitis occurring in the early stages.

The liberal spirit which characterises this establishment is evidenced by Dr. Chosky's quaint statement that: "A temple has been erected in the asylum grounds containing the usual idols and other accessories, including religious books" (p. 6).

It would appear that no very strenuous attempts at separation of the sexes are made at Matunga, and those who wish to do so are allowed to marry. Under these arrangements, however, but few children are born. Dr. Chosky's report states that during the first nine years of the asylum's existence only seven children were born. Five of the seven died in infancy without having shown any signs of the disease. In all of these instances both parents were the subjects of leprosy in its neuritic form. One of the two who survived it probably the case referred to in my notes, having become a leper at the age of four.

In the report of the Matunga Asylum the term "Salsette Christian" is applied to all the Christian inmates, and although it is for the most part correctly so used, it yet no doubt includes some who came from other districts. If all were really from the island of Salsette, we ought then to calculate the ratio on the Catholic population of that island, and not, as I have just done, on that of the whole Bombay Presidency. This would give a ratio greatly in excess of that of India as a whole. The population of Salsette, as given by Hunter, is :—

Men	58,540
Women	49,609
Total	108,149
Hindus	74,736
Mohamedans	7,036
"Others"	26,377
Total	108,149

The Salsette Christians are consequently less than 25,000, and ought to supply only 12·5 lepers, but they probably supply 100, as many as sixty being at one time inmates of the Matunga Asylum.

Respecting the non-Christian lepers in the Matunga Asylum, Dr. Chosky, the medical superintendent, in one of his published reports states : "Most of the patients are Hindoos belonging to the seaboard of the Konkan, and most of them, if not habitual eaters of fish, have at least been using it as an article of food."

Excessive Prevalence in Certain Parts of Bengal.

The following are some of the districts in India in which excessive prevalence is recorded.

Beerbhoom (2,500)	1 in 242	41 per 10,000
Moorshedabad	1 in 762	13 per 10,000
Bancoorah	1 in 333	30 per 10,000
Burdwan (5,000)	1 in 441	23 per 10,000

It is to be remembered that these figures may be very misleading. These districts may have attracted the lepers from much larger neighbouring ones by the presence of leper homes or shrines of repute.

PREVALENCE OF LEPROSY IN INDIA.

Indian Medical Gazette, October 1st, 1877. Extract from review of "Leprosy in India," by Drs. Lewis and Cunningham :—

"The total number of lepers in British India amounts to no less than 99,073, or 5·4 in every 10,000 of the population."

Province.	District.	No. per 10,000.	Remarks.
Bengal.		5·2	
	Beerbhoom	41·2	
	Bancoorah	30·0	
	Burdwan	22·6	Near Calcutta.
	Kumaun	21·1	
	Banda	19·6	Punjab.
	Dehra Doon	19·0	In a mountain valley, Mussoorie.
	Assam	1·6	
	Chittagong	2·6	
	Orissa	2·4	
British Burmah.		11·6	

An estimate of the prevalence of leprosy in the three provinces of India, given in the *Indian Medical Journal*, 1890, records :—

Bengal	71,287
Madras	13,944
Bombay	13,842

The population of India is 250,000,000; or, with Burmah, 280,000,000. It has 100,000 lepers, a fairly stationary number. The Commissioners (see p. 56 of Report) calculated that in 1881 the ratio per 10,000 was 6, and that in 1891 the ratio per 10,000 had been reduced to 5.

RELATIVE PREVALENCE OF THE DIFFERENT TYPE FORMS AT DIFFERENT PLACES.

Danielssen and Boeck estimated the anæsthetic form in Norway as only 33 per cent., the tubercular as 51, and the mixed as 16.

The Indian Leprosy Commission found 56·6 anæsthetic, 12·2 tubercular, and 31 mixed.

Chosky, in his statistics of Matunga, found the tubercular more common than the Commission did. In a total of 1,600 cases he found 40 per cent. anæsthetic, 47 tubercular, and 13 mixed.

The decision as to allocation of individual cases to one or other group will, however, often depend much upon the judgment and opinion of the observer.

Colonel Lee's estimate of the proportions in the Madras Hospital gave 242 tubercular cases, against 291 of the anæsthetic type.

DECREASE OF LEPROSY IN CERTAIN PARTS OF INDIA.

Ratio per 10,000 population.

	1872.	1881.	1891.
Bengal	7·8	9·4	6·2 (4·8 in 1901.)
N.W. Provinces	4·2	4·0	3·6
S.W. Punjab	3·0	2·0	1·0
Sind	1·4	1·0	0·7 (0·47 in 1901.)

To these the Bombay Presidency may be added, since the last census has shown a reduction of 50 per cent. This reduction is attributed to famine. In India famine years are always very influential in disturbing the statistics of leprosy. In the years immediately following the famine there is a great diminution, but some years later this is often more than made up for. The explanation is obvious.

INCREASE OF LEPROSY IN CERTAIN PARTS OF INDIA.

Ratio per 10,000 population.

	1872.	1881.	1891.
Behar ... ... (Disproportion in the two sexes very great, 1·5 to 6.)	3·9	5·7	4·5 (Decrease 1901, 3·6.)
Chota Nagpore	2·5	5·3	4·4 (7·7 and 4 for males and females. Census, 1901, 5·8.)
Cachar	4·7	7·8	11·6
Assam (with Cachar)	6·8	7·0	12·3

The explanation of the increase in the Assam territory is easily given. In connection with the tea plantations there has been a large immigration of Coolie labour, and to feed the Coolies a large quantity of salted fish is imported, much of it of very inferior quality. As to Chota Nagpore it is not improbable that the early census was not trustworthy.

THE PUNJAB.

The Jullunder district is stated by the Commission to have the largest leper population in the Punjab. Chamba is stated to have shown by the census of 1891, 20 to 30 lepers per 10,000. In all three censuses the highest ratios were shown to be in Bancoorah, Burdwan, Beerbhoom, Simla, Dehra-doon, and Kumaun.

In a Report of the Sabathu Leper Asylum, Dr. Carleton mentions that others than lepers were in the asylum: five paralytics, one insane, and four infirm persons. He speaks very disparagingly of all measures of treatment, excepting palliative ones, cleanliness, and the use of oils, especially the deodar oil. Two Europeans had been sent to the asylum during the year (1895).

ARCOT (MADRAS).

From the Madras District Manual, concerning North Arcot, compiled for the Government by Mr. Arthur F. Cox, and revised by Mr. Stewart in 1894, we obtain information as to the prevalence of leprosy in different parts of the North Arcot district.

On p. 108 it is stated: "The fact here brought out that leprosy is least prevalent in the area of least rainfall is in accordance with what is observed elsewhere."

The suggestion is obvious that the region of less rainfall is the region of less production of freshwater fish.

A statement is given showing the number for each principal caste out of which one is afflicted with leprosy. From this it would appear that only one in 15,000 is so afflicted in the Kurumban caste (shepherds and wool-weavers), and only one in about 6,000 in the following castes:—Odde, Mádigi, Shanan, Tsakala, Karlam. The following show a proportion of more than one in two thousand: Sheik, Mutracha, Chakkilyan, Gandla, Udaiyan, Yannan, Kaikolan, Ambattam, Kammala, Labbai, Chetti, Palli or Yanniyan, Yellala, and Agamudaiyan. Most of these castes are of the agricultural population, and none of them belong to the priests.

The proportion of lepers in North Arcot is rather more than 5 per 10,000.

The reporter states that the abstract shows that in the case of many castes the prevalence of leprosy differs widely from the Presidency average for that caste. This suggests that the affliction is due rather to local circumstances than to any characteristic of particular sections of the population. Thus we are left to believe that the local conditions, and not the caste, are chiefly influential in the production of leprosy; but at the same time it is not well to wholly neglect the question of caste.

In another table in the manual of North Arcot the distribution of lepers by age is given. It gives also that by sex, and shows that out of a total of 1,136 lepers 888 were men, and only 248 were females. As regards age, 2 were under 4, the sexes being equal; 6 were under 9, five of whom were males; 21 were under 14, sixteen of whom were males; and 43 were between 15 and 19, eleven only being females.

It would thus appear that the difference in the proportion of the two sexes begins in early life, but is not observed in actual infancy. The figures are, however, not sufficient to justify any positive conclusion.

LEPROSY IN MANGALORE (MADRAS).

Mangalore is a recent Roman Catholic centre, having a college, convent, etc. It has also a leper house. It is the capital of the Kanara district, and is a miniature Bombay. It has both river and sea fisheries. It may be supposed that the supply of fresh fish is good.

A table is given in the volume from which we quote ("Manual of the South Kanara District"), which appears to show that the native Christians do not suffer from leprosy so much as certain other castes; in the South Kanara district only about double that which the Brahmans do, and in the Presidency only slightly in excess of the Brahmans. According to this table the Maráthi suffer most:—

Marathi, in South Kanara	1 in 508
,, ,, the Presidency	1 in 942
The Brahmans, in South Kanara	1 in 2,000
,, ,, ,, the Presidency	1 in 3,000
Native Christians, in South Kanara	1 in 1,000
,, ,, ,, the Presidency	1 in 2,200

In this district a caste called Nayar suffers the least, furnishing only one in 5,000 in South Kanara, and one in 2,400 in the Presidency. A sect called Mappilla comes next in comparative immunity.

It will be seen that these figures imply 20 in 10,000 of the Maráthi in South Kanara, and 10 per 10,000 of Native Christians, and about 5 in 10,000 of Brahmans.

The two leper asylums in Mangalore have been established since 1881 by local Christian Missionaries. The lepers flock to these from other districts, even from Bombay. One of these asylums is maintained by the Jesuit Society and contains upwards of 50 indigent lepers. Most of the lepers gave a history of leprosy having existed in their families.

The Roman Catholics in South Kanara number 66,678, the Protestants only 4,549. The Roman Catholics thus equal 93·62 per cent. of the total number of Christians; 99 per cent. of the Christians are natives. There are over 10,000 Jains in the Presidency, but no leper is recorded amongst them.

Of the Maráthi and the Nayar, who offer respectively the greatest and least number of lepers, both are agriculturists, formerly military and dominant.

Madras Fishing Establishments.

In one of the Madras District Manuals, speaking of South Kanara, it is stated that all the salt required for consumption is obtained from Bombay. The inhabitants prefer the Bombay salt to that of Madras, as it is both cheaper and lighter. "Steps are being taken to ascertain whether it is not possible to produce light salt without loss of chemical purity. The import of salt into South

Kanara is slowly but steadily going down." There are nine fish-curing yards in the district, where salt is supplied for pickling fish free of duty. The total quantity of fish cured annually is, however, only about thirty to forty thousand maunds, a quantity insignificant as compared with the 400,000 maunds supplied by the adjoining district of Malabar. (See p. 175, India Manuals.)

In South Kanara fishermen are numerically the most important of those providing animal food. "There are 31,422 persons engaged in catching, curing, and selling fish, while the strength of the fishing castes is 39,402." Apparently the chief fishing caste is the Moger, supplying seven lepers per 10,000 in South Kanara, and an equal number for the Presidency.

It is said that the majority of the fishermen are pretty well off. Salted fish to the value of 124,590 Rs. was *imported* in 1893-4. During the same period salted fish to the value of 242,432 Rs., and dried (but not salted) fish to the value of 16,793 Rs. was *exported*.

MADRAS CITY AND PRESIDENCY.

At Madras, about 1840, Dr. W. G. Davidson, then surgeon to the Leper Hospital, wrote : "Leprosy would appear to originate in the use of grain and other unwholesome food, such as semi-putrid fish and other meat, want of use of salt and of vegetables."

Dr. Van Someren, writing sixteen years later at Madras, stated that without endorsing the whole of this opinion, he could not but attach considerable weight to part of it.

The Madras District Manuals published by the Government Press (1895) contain some items of information respecting leprosy. In that for South Kanara (No. 118) we are informed that leprosy is more frequently met with in the Taluks (parishes) that border on the sea than in the interior of the district; and further, that this is "in accordance with the generally observed fact that this disease is more common in moist than in dry localities." The coast Taluks numbered per million 896 lepers, the inland Taluks 640. Lepers were most common in Mangalore and Udipi. This report, published in 1895, shows a small increase in the number of lepers.

Early in the last century there existed in Madras a poor-house to which was attached an infirmary. Lepers were admitted together with healthy paupers, and their number in January, 1813, amounted to forty. A movement in favour of a separate leper establishment occurred at this time, but there is not the slightest hint that any instance of supposed contagion had occurred.

The governing Council recommended that the lepers who had come up in the hope of treatment should have it explained to them that their disease was incurable, and should be encouraged to return to their private homes. It was, however, represented to it that many of the lepers had received much amelioration from the treatment, and it would be a great hardship to compel them to return to their homes, and the result was that a few years later a Government Leper Hospital was built. Many lepers, however, preferred to remain at their homes, and to live by begging. The lazaretto was subsequently enlarged. In the early days of this leper hospital its occupants were encouraged to engage themselves in gardening, and they grew fruit and vegetables which were sold for their advantage.

In 1860 Van Someren found in this asylum seventy-five lepers.

Leprosy in Returning Indian Emigrants.

Emigration Report: Port of Calcutta, 1901.

Every year a certain number of natives leave India to work as labourers during a specified period of time in British or Foreign colonies. These are recruited under licences granted by the emigration agent. The licences are liable to be cancelled on account of misconduct or other reasons, *e.g.*, in one found suffering from leprosy the licence was cancelled (1901).

On p. 8 of the above Report we read:—

> "Seventeen of the return emigrants who reached India were suffering from leprosy, as compared with eight in the preceding year. Of these, eight came from Fiji, four from Trinidad, three from Natal, and two from Mauritius."

Page 20:—

> "Among the (returning) emigrants who reached India from the Colonies, there were eleven suffering from leprosy, as compared with twenty in 1898; six came from Fiji, two from each of the colonies of Mauritius and Trinidad, and one from Natal."

In connection with these figures as to the return of Coolies as lepers from the Colonies (and more especially as regards those from Natal, where they certainly could not come in contact with native lepers), it is to be remembered that the indentures signed by the Colonial employers make the supply of salt fish compulsory. It is probable that it often reaches the Natal Coolie in very bad condition. Fortunately in many instances, in spite of the covenant, it never reaches him at all.

LEPROSY IN CEYLON.

In the College of Physicians Report (1862) we have under initials "H. D." the statement that "Leprosy is not an uncommon affection among the lower orders of the natives. I have seen it occasionally in Europeans and the burgher class." H. D. thought the anæsthetic variety comparatively rare.

To this report three medical men resident in Ceylon contributed under the initials of "H. D.," "T. A. P.," and "D. G."

In the main they agreed as to the facts. They thought the disease more frequent on the western coast than elsewhere, and rare inland; that more males than females suffered, "T. A. P." even suggesting that the disproportion was as thirty to one. It occurred both amongst Singalese and Tamils, and was *very* rare amongst the better classes. After remarking that the natives practise ablution frequently and cannot be said to be filthy in their habits, "H. P." states that their ordinary diet consists of "boiled rice, vegetables, cooked with curries, and curries made of inferior kinds of fish."

"T. A. P.," after the statement :—

"It is more frequent in the maritime districts and the fishing coasts, and that it is seldom seen in the inland and hilly districts," adds, "an entirely fish or salt-fish diet and want of cleanliness invariably occur among the natives who are subject to the disease."

"T. C." writes :—

"In Ceylon this disease generally appears in towns, and chiefly in Colombo, not from any unfavourableness in their climate, nor from their being low, damp, or malarial, but, as I believe, principally from bad diet and filthy habits."

Possible Causes of Diminution of Leprosy in India.

It seems quite possible that a general diminution in the consumption of fish in India during the last quarter of a century may have had some influence in reducing the prevalence of leprosy. Many influences may have contributed to this reduction. There was formerly, in many districts, a tax on fishermen, and fishing rents were levied. When, under British rule, it was permitted to the peasantry generally to fish where they liked, it became no one's business to prevent undue depletion of fisheries. From an article in the "Fisheries Exhibition Literature," Vol. XII., p. 138, we learn that "at first the public, pleased at the remission of rents and the removal of restrictions, employed redoubled energy, and thus augmented their immediate profits . . . After two or three years fish became scarce, fishing is no longer remunerative, and the misapplied energy eventuates in nothing but small fish remaining."

"Among the artificial causes deleteriously affecting fisheries in many districts are irrigation works, which are formed by throwing a weir across a river, and diverting a large amount of water down a main irrigation canal. Fish migrating down rivers, pass into these canals, where considerable falls exist, but they can never reascend to the river. Thus these canals become enormous fish-traps, wherein all the finny tribes are destroyed whenever the canals are run dry in order to see what annual repairs are required. Similarly all fish passing into the side channels, which are generally flooded every alternate week, become killed, as no refuge tanks are in connection with these canals. Sometimes irrigation is carried on by means of diverting entire rivers into paddy fields, in which case all the fry they contain perish."

The writer (Dr. Francis Day) states that the capture of young fish with nets of very small mesh is also extensively carried on by women and children, and also that the waters are sometimes poisoned for the same purpose.

Fish-Eating in India.

Whoever wishes to arrive at trustworthy conclusions as to fish-eating in India must collect evidence from many and various sources, and must in the end allow himself to be guided rather by general probability than by the statements of any single witness. Sources of error, quite apart from intentional deception, abound on every side. The subject is one to which but very few have given any careful attention, and a certain degree of carelessness as regards minute accuracy pervades every statement of fact in the East.

There are undoubtedly very large districts in which the supply of fish is but small and intermittent, and nowhere perhaps are any in which it forms a staple article in the sense in which such an assertion might be made as to Norway and Iceland. It must be remembered, however, that the climate of India is everywhere such as to make it very difficult to keep fish sound.

Freshly caught fish will become tainted in a few hours unless special precautions are taken. It is perhaps "fresh fish" so tainted, which is chiefly to be feared in India. That which has been imperfectly salted may also be liable to soften and decompose, but of that which is well dried it is probably true that in most parts and through the greater part of the year the climate will keep it dry, and quite free from all risk of decomposition. If, however, the drying have been inefficient then this article is probably the most dangerous of all.

"Bombay duck" and "Maldive fish," both of them almost as dry as wood, are not likely ever to become the habitats of bacilli. Owing to the dearness of salt, salted fish, although it may be met with nearly everywhere, is not a very common article of food in India.

As regards many inland districts where leprosy prevails more or less, we can only suspect fresh fish, since the importation of that which is either dried or salted is very small. In these regions it must be remembered that the supply is intermittent, abundant in the wet season, and almost none in the dry. It is also, if we come to detail, local. A village may be so situate that it has neither stream nor tank from which any considerable supply can be had; under such conditions it is obvious that there will be considerable inducements to attempt the preservation by home-devised methods of salting and drying. Without doubt this is done to some extent almost everywhere, and thus although there may be no open market for salt-fish, and little or none to be found in the bazaars, there is still a not inconsiderable use of it, and that too in its most risky of all conditions.

I have already in former pages recorded much of my personal inquiries on this topic, and shall be content here to quote in their support the conclusions of an independent observer who had no preconceived opinion as to the fish origin of leprosy.

DR. DAY ON FISH AS FOOD IN INDIA.*

"In the different races amongst whom I have travelled during my investigations respecting fisheries, between Cape Comorin and Mergin, irrespective

---

[*] See *Indian Medical Gazette*, January and February, 1871. Surgeon Francis Day, F.L.S., F.Z.S., Madras Army, "On Fish as Food; or, the Reputed Origin of Disease."

of my inquiries during the five years I was in Malabar, etc., I have observed fish as food held in various kinds of estimation. In some portions of the Madras Presidency, Brahmins and Hindus of high caste refuse to eat fish, and this is especially the case in Malabar. In Tanjore, and advancing towards Madras, exceptions to the strict carrying into effect of the Hindu law—not to eat that which had life—begin to be observed; but still I have been at important towns, as at Myaveram, where caste prejudices prevented all but eleven families from using fish as food. In many parts of the Madras Presidency salt fish is chosen in preference to fresh, whilst I have not perceived that a state approaching putrescence has been considered to render the article unfitted for consumption; in fact, the inland market for salt fish in the Madras Presidency appears to be inexhaustible, it being only the very inferior quality of the article which prevents the trade increasing to an enormous extent. The natives mostly eat it in the form of curries, and in the town of Madras some of them object to fresh fish during periods of sickness.

"As the limits of Bengal are approached, as at Orissa, a vast change commences to be apparent, where—with the exception of religious mendicants, and those who have taken a vow that neither themselves nor their descendants shall eat animal food—all classes, even the Brahmins, join in its consumption, and the same rule obtains in the portions of Lower Bengal through which I have travelled. But these people prefer the fresh fish; the salted article begins to find less favour, perhaps from dread of persons of a lower caste than themselves having prepared it. I understand that, inland, there is not a good market for salt fish, whilst sharks, skates, and rays, which usually find a market in Madras, are commonly held as unfit for food by Bengalis.

"The Jews near Cochin, and the Mahomedans throughout the places where I have been, except in Burmah, where they eat *nga pee*, reverence their traditions not to consume the *siluroid* or scaleless fishes, neither the sharks, skates, rays, or eels. Proceeding further to the east we find the Burman race, who, as Bhuddists, profess a religious horror at taking the lives of the lower animals; but being immoderately fond of a fish diet, they judiciously condemn the fishermen to eternal perdition, whilst they consume their fish in the form of *nga pee* in peace. A Burman would consider a meal to be but a bad one in which *nga pee* did not form a part; it is, therefore, necessary to point out the condition in which he eats fish.

"Nga pee is of two kinds, *nga pee goung*, or 'nga pee whole,' and *nga pee toung*, or 'nga pee pounded.' The mode of preparing the former is after having removed the head, the fish, if large, is split in two; it is then cleared and dried in the sun for a few hours, salt is then rubbed into it, and the fish, along with others, is packed in a jar. The next day the process is repeated. In some fisheries, where large quantities of fish have to be thus preserved, they are laid in long bamboo baskets, in alternate layers of fish and salt, and the whole buried for some time under ground. They choose the siluroid fishes in preference to others, probably because no scales would be in the preparation, which, when swallowed, might occasion intestinal irritation. The smell of *nga pee*, as eaten by the middle and lower classes, is that of a semi-putrid animal substance; in fact, in a sanitary point of view it may be looked upon as in that condition.

"*Nga pee toung*, or 'nga pee pounded,' is either made from fish or prawns. When fish are used, they are first cleaned, then with salt are placed in a large trough, which has a tube or pipe opening from its floor. Men wearing wooden clogs now tread the fish and salt into one homogeneous mass, the superabundant fluid runs off by the tube, and is collected as a condiment for sale. At Mergin, where prawns are thus employed, they, along with one-third their weight of salt, are first dried in the sun on mats for five or six hours, and subsequently they are pounded in a wooden mortar; or, if prepared at the islands, men wearing wooden clogs tread them into a mass. The fluid is collected as already described. These preparations may undergo refining in various manners, but the foregoing is the essential process, and this paste is largely eaten as food.

"The Andamanese may be said to exist principally upon fresh fish, pork, and tortoises or turtles, for vegetables are consumed to a very small extent, so long as they can procure animal food. Mullets they prefer to any other fish."

Page 497 :—

"In the Punjaub comparatively few of the inhabitants are prohibited by their religion from consuming fish, but there are many Hindus who reject it, as well as the rural population of some districts. But of those residing in towns, and in hilly ranges, it appears that, if the Brahmans are excepted, the consumption of fish is only limited by the paucity of the supply and the cost of the article. In Sind, fish is generally eaten by the population of the province, whether Mussalman or Hindu (unless a Brahman),

"In the North-West Provinces, containing about 28,000,000 of population, out of twenty returns received from native officials, seventeen give more than half of the people as not forbidden by religious scruples from eating fish. In Oudh, the majority of the people appear to eat fish, but the supply is unequal to the demand. In the Bombay Presidency, the majority of the inhabitants of the inland districts are consumers of fish when they can procure it. In Haiderabad, Mysore, and Coorg, more than half the population are fish consumers; in South Kanara 89 per cent.; in Madras the majority, the exceptions being Brahmans, goldsmiths, high-caste Sudras, the followers of Siva, Jains, etc. In Orissa, more than half the people; in Bengal proper, from 90 to 95 per cent.; in Assam and Chittagong almost the entire population; and in Burmah, in the form of nga pee, its use is universal.

As Buddhists, the Burmans profess a religious horror at taking the lives of lower animals; they console their consciences (while indulging in it) with the idea that the deaths of the animals used by them as food must be laid to the account of the fishermen, and cannot in any way be attributed to the consumer's fault. The walls of their temples have pictures of the terrible tortures the fishermen will have to endure in a future state of existence. In some of these interesting representations are large fires being stirred up by devils, while other evil spirits are dragging more fishermen in nets towards the burning fiery furnace, helping on some by striking fish-spears into them from behind, and hauling them forward by hooks and lines fixed to their mouths towards the place of punishment. But it may be asked are these Poongees' (priests) practices in accord with their teachings? By no means, as the following example will show.

"At Yahdown, on the banks of a branch of the Irrawaddi, a fisherman (Sen Thoogyee) built a Kyoung, or monastery, as his great hope was to be termed a Kyoung taga, or founder of a monastery, a highly prized title amongst the Burmese. Poongees came, and Poongees went away, but they did not care to remain and partake for any lengthened period of the hospitalities of their host and disciple. At last one old priest appeared, who seemed to consider the quarters as desirable. To him, in great trepidation, the owner put the following question: 'Why, my father, do not the Poongees approve of my monastery, for none but yourself have remained over the going down of two suns?' 'Because, my son,' replied the holy man, 'do you not break the law by depriving the fish of life?' 'True,' he answered, 'but were I not to do so, how could I supply your table with fish, or how could I live were I to give up my employment?' The only reply he could obtain was: 'Better to fast while keeping the law, than to feast whilst breaking it.'

"With sorrow the disciple took the priest at his word, and for three days refrained from fishing, giving his preceptor merely vegetables for his diet. On the fourth morning, when the same fare appeared, the Poongee observed: 'My son, when you fish the river, does your net extend all across, permitting no fish to escape, or is a portion of the river free for those which select to pass to one side?' 'Not all across, but only one-third of the way,' he answered. 'Well, then, my son,' said the priest, 'I have been seriously considering the subject, and have arrived at the conclusion that, if you leave room for the fish to ascend or descend the stream, and they will not avail themselves of it, but rush headlong into your net, the fault is theirs and not yours. Even Gaudama blessed the hunter who met him when he was hungry, and supplied him with venison. This was accounted as a meritorious act, although he must have killed a deer to obtain it. So go, my son, and procure me some fish, for I am hungry.' From that day the priest consumed his fish in quietness, and refrained from inquiring from whence it had been procured.

"Investigating how the local markets were supplied with fish up to 1873, the replies from native officials gave the following results. In the Punjab, one in ten markets was sufficiently supplied; in the North-West Provinces, one in three; in Oudh, one in four. In Bombay the amount was stated to be insufficient in all, and the same reports came from Haiderabad, Mysore, and Coorg. In Madras, near the sea, the quantity of fish was sufficient, but only in one in ten of the inland markets. In short, merely one-tenth of the bazaars were reported as fully supplied with fish, and of these one-fifth obtained them from the sea-coast.

"Fisheries, to a greater or less extent, exist in the Indian Ocean, as well as up to the mouths of the larger rivers, in backwaters and estuaries; while, parallel to certain places, especially along the coasts of the Madras Presidency, vast mud-banks are present such in the sea, having a thin consistence that many kinds of fish are able to obtain abundance of food there as well as a suitable locality in which to deposit their ova. The most casual observer cannot fail to perceive how numerous are the varieties and vast the number of the finny tribes in the seas of India, but from some cause—whether due to the legislative enactments and local obstructions, or native apathy and impecuniosity—the harvest has, up to within the last few years, been comparatively untouched; an enormous amount of food still remains uncaptured, while famines are devastating the contiguous shores."

INHERITANCE.

Profeta, for Sicily, rejects contagion, and considers inheritance the one cause of spreading.

Lewis and Cunningham do the same for Kumaun.

MOSQUITOES.

The experience of Minicoy confutes the suggestion that mosquitoes spread the disease. They are extremely abundant and troublesome, but leprosy is restricted to certain classes of the community.

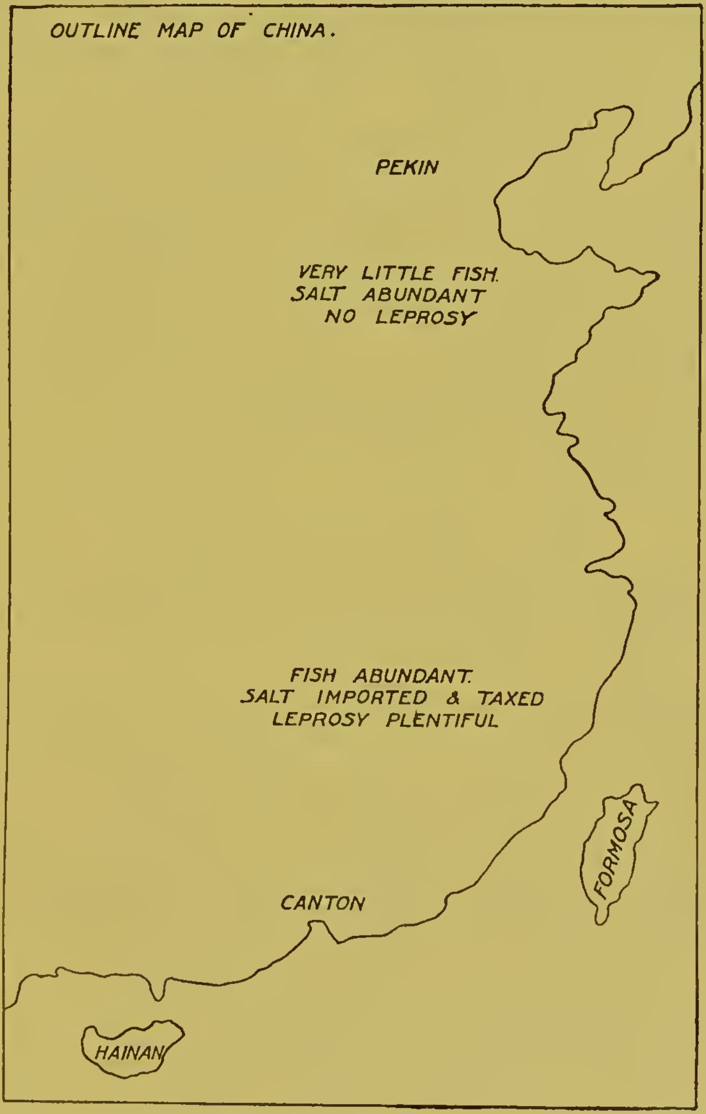
FAVOURITE FOODS IN CHINA.

From John Francis Davis's "Description of the Empire of China," Vol. I., p. 311, I take the following extract:—

"The general prevalence of Buddhism among the population is perhaps one of the reasons that beef is scarcely ever used by them; although the multitudes of bullocks killed annually for the use of the European shipping, prove that their religious scruples cannot be very strong. It must, however, be observed, that some absurd prejudices and maxims, not to say positive laws, have always existed against an extended consumption of flesh food. There are, accordingly, no people in the world that consume so little butcher's meat, or so much fish and vegetables. The rivers and coasts of this country are profusely productive of fish, and the people use the greatest ingenuity in catching them. Carp and mullet were observed in all towns bordering on the route from Pekin."

IMMUNITY OF THE PEKIN DISTRICT.

In connexion with the above statement as to the occurrence of fish in the Pekin district where no leprosy occurs, it is necessary to bear in mind that there is there great abundance of salt. Relatively to the southern districts it is also to be remarked that the quantity of fish is but small. The Pekin district, as has been already noted, is an arid one. The abundance of salt may, however, be assumed to be the real cause of the absence of leprosy. The appended sketch map may afford a graphic realisation of the facts.



I have asked special attention to these remarkable facts both in the columns of the *Times* and those of several medical journals with a request that any who could offer other explanation than that now suggested would communicate with myself. No other explanation whatever has been forthcoming and I have waited as long as possible before sending this statement to press (November, 1905).

South China and Salt.

It is to be remembered that the Chinese of the south are trained to do with as little salt as possible. With them salt is imported and heavily taxed. Hence when they emigrate their methods of preparing food, especially fish, are adapted to dispense as much as possible with salting.

North China Coast unfavourable for Fishing.

Anyone who inspects carefully, in a large map, the coast line of China, will be struck by the fact that in the southern half there are very numerous indentations and small adjacent islands, whilst that the upper half shows a level line. The former condition is obviously likely to favour fishing and the latter not. A similar observation applies to the coasts of Australia and Norway.

Leper Hospital in Hangchow.

The following is an extract from the *China Medical Missionary Journal*, and refers to Hangchow:—

"The work among the poor lepers is full of interest and encouragement, but it is very sad and often terribly depressing. Their condition, however, is much better since the refuge was removed outside the city; there they have fresh air, their boat, their fishing nets, their vegetable garden, the hills to climb, and are very happy. Although we have been treating lepers for twenty-two years, we do not yet know the cause of the disease, and have not found a remedy for it. We cannot say that it is not due in the main to the consumption of decomposing or imperfectly cured fish, because fish is largely eaten by the Chinese, and often in a bad condition; salt is dear, and most of the fish is sun-dried, and the climate is hot and putrefaction is speedy, and we have all the conditions which favour the Hutchinson theory. So far as our experience goes contagion is unknown. The attendants do not contract it, husband and wife very seldom suffer at the same time, and we hardly ever meet with two cases in one family.

"Our refuge is not a prison, but a happy home; they are allowed to pay visits to their own homes, and friends are allowed to visit them at will."

CHINESE OPINION AS TO CONTAGION.

Mildmay Mission Hospital,
13th December, 1904.

DEAR SIR,—Reading in the *Daily News* a few days ago your remarks about the lepers in Robben Island, and your conviction as to the non-contagious nature of leprosy, a proverb which I heard from the Chinese when I was in China over twenty years ago came to mind. I think you may be interested to know it, as showing that the Chinese are of the same mind as yourself as to the difficulty of communicating leprosy. The proverb is a rhyme of two lines, the translation of which is:—

"You may sleep in the same bed with *a leper;*
But you must not pass the door of one who has the *itch*" (Scabies) (in case of infection).

I am, yours truly,
WILLIAM GOULD.

To Jon. Hutchinson, Esq.

ISOLATED ABORIGINES IN LEPER DISTRICTS USUALLY FREE.

It is interesting to note that in several of the Islands of the Eastern Archipelago there are remains of aboriginal populations still living apart from more recent settlers. The same is the case in India and many other places. Where this is the case the aborigines are almost always free from leprosy. They usually inhabit mountain fastnesses, the new comers having driven them from the seaboard and the fertile plains. They are almost invariably hunters and not fishermen, and they cannot afford to import dried fish.

LEPROSY IN MOUNT ATHOS.

The following is from Dr. Ashburton Thompson's Essay. The words "endemic seat of the disease" in the last line is simply equivalent to "a fish-eating district."

"In order not unduly to interrupt the course of these remarks, I place in this foot-note the following observation, which seems to me to have importance in itself, and in its conclusion. In the graphic work of M. Zambaco, from which I have already quoted, may be found at pp. 220–22 an account of the monks of Mount Athos. It was chiefly furnished by Dr. Phanarioudi, who had for long attended the many convents there. Fifty years ago the monks first erected a refuge for the accommodation of lepers who having been driven from their villages in the Peloponnesus—from Metelin, Volo, the islands of Thassos and Calimnos, &c.—took refuge in the forests with which the mountain is clothed, and perforce led there the lives of wild beasts. Among the monks were many who thought it would be a sign of special grace if they were stricken with leprosy, and who consequently made every effort to contract the disease; they associated with the lepers in their lodging, shared their food, and even wore their flannels and underclothing while still saturated with discharges from their leprous sores. But, although these attempts had for years been systematically and perseveringly made, not a single monk had ever suffered in the least; and that although their food and filthiness of body and dwelling were such in every respect as are commonly thought favourable to development of this disease. And M. Zambaco concluded by remarking that "un seul fait de transmission observé dans cette localité isolée où toute contagion peut être suivie avec rigueur et précision, et où la lèpre n'est point endémique, aurait été certes de la plus haute importance. Mais un tel fait ne s'est jamais montré." And thus it appears that the different results which followed in Norway and in Greece on procedures apparently so closely parallel are not, after all, inexplicable; for in reality the conditions differed in an important particular. Norway is, but Mount Athos is not, an endemic seat of the disease."

THE JAINS.

Jainism had its origin in the teaching of a monk named Vardhamána or Mahariva, who was born near Patna, B.C. 599. Hooker in his *Himalayan Journal*, records that at Madduobund, his provisions not having come, he sent his servant into the bazaar for some fowls and eggs, being ignorant of the fact that it was an exclusively Jain population. "My servant was mobbed for asking for these articles, and parched rice beaten flat, with some coarse sugar was all that I could obtain."

The Jains in the Bengal Presidency census, 1891, number short of 8,000, but the reporter suggests that many may have returned themselves simply as Hindoos. The Jains of the Punjab number 50,000. The Baniya castes "who represent the ancient Varsyas" closely approach Jainism.

FISH-CURING ON THE AMAZON.

"I had an opportunity of seeing the manner of curing fish practised here. They are partially skinned, and a large piece of meat cut out from each side, leaving the backbone with the head and skin attached. Each piece of meat is then cut lengthways, so as to unfold into a large flat slab, which is then slightly sprinkled with salt and laid upon a board. Other slices are laid on this, and, when the salt has penetrated sufficiently, they are hung upon poles or laid upon the ground in the sun to dry, which does not occupy more than two or three days. They are then packed up in bundles of about a hundred pounds each, and are ready for market."—Wallace's "Travels on the Amazon," p. 70.

"All the fish not used at the time are placed on a little platform of sticks over the fire, till they are so thoroughly dried and imbued with smoke, as to keep good any length of time. They are then used for voyages, and to sell to travellers, but having no salt, are a very tasteless kind of food."—Wallace's "Travels on the Amazon," p. 339. (Indians referred to are "Uanpés").

Failure of Experimental Inoculation.

In corroboration of what I have advanced as to the failure of attempts at experimental inoculation I may quote the following summary of them from the able pen of Dr. Ashburton Thompson.

"Very many attempts have been made (I reckon that 85 to 90 is a number about the mark) by trustworthy and competent observers to transmit leprosy from lepers—(*a*) to the healthy; (*b*) to those suffering from other maladies; (*c*) to apparently unaffected parts of the bodies of those already suffering from leprosy. All of the attempts under (*a*) and (*b*), which numbered more than fifty, and which alone have importance, uniformly failed, save Dr. Arning's, in which there was apparent success, but under circumstances fatal to its evidential value."

"All of the many attempts made to inoculate the inferior animals, both warm and cold blooded, are considered by the best authorities to have failed. Some doubtful successes have been recorded; but Dr. Wolters' account of them, and especially the results got by MM. H. Leloir, Campana, and Wesener from implanting portions of dead leprous tissue (preserved in alcohol by Professor H. Leloir for three years, and then in addition heated to 48° during an hour) should be studied."

Erroneous Statement as to Fish Supplied to London.

The quotation from the Canton Lectures referred to at a former page is as follows :—

"About 4,200 tons of fish; over 4,000 sheep; nearly 700 oxen;

about 90 calves; 4,000 pigs, including bacon and hams; not less than 5,000 fowls and other kinds of poultry . . . are daily brought to this city." Thus it might appear that for every sheep and pig, and almost for every fowl, eaten by Londoners a ton of fish is consumed.

Excessive Severity of Leprosy in Norway.

I have formed a strong impression that leprosy is a more severe disease in Norway than in any other part of the world which I have visited. It is unsafe to trust to impressions formed from personal observation, but I believe that in this instance mine are to some extent corroborated by published statements. Hansen & Looft's tables give the nodular form as more than double the maculo-anæsthetic;—950 against 449. Now this proportion is probably much higher than that recorded by any other observers.

In Kumaun (where fish is scarce) Lewis and Cunningham counted 49 anæsthetic cases, 15 mixed, and only 12 tubercular. In Kattiawar, Dr. Vandyke Carter examined 262 and found 44 per cent. tubercular and 56 anæsthetic.

In a paper on leprous tubercle of the eye by Mr. J. H. Sylvester, Professor of Ophthalmic Medicine and Surgery at Bombay in 1870, the author states, "I have seen but three lepers with serious affection of the eye during three years' practice, although leprosy is common in Bombay." In Norway Dr. Borthen of Trondhjem has devoted a special treatise to leprous diseases of the eye.

Analogies with Certain other Maladies.

The ptomaine poisoning which occasionally results from eating sausages, rabbit pie, and the like, affords, as has been remarked, a certain illustrative parallelism with what occurs in leprosy. The noxious ingredient in each case is generated unexpectedly, and no indications of its presence are usually offered to warn the eater. Those of large appetite, and those most fond of the special article, are in each instance those most likely to suffer, whilst individuals whose personal tastes lead them to abstain escape. In proportion to the frequency of the use of such articles in any given community, and to the carelessness with which they are prepared and stored, will be the risk of occasional poisoning. In both cases the risk is almost world-wide, but the actual incidence very erratic. The most obvious difference is that in the one the phenomena produced are of speedy development and acute in character, whilst in the other they are produced insiduously after a long interval, and are very chronic in their course. From this it follows that in the one the source of the poisoning is usually easily detected, whilst in the other it may be difficult or impossible to trace it. Poisonings by mushrooms, or rather by fungi mistaken for them, stand in much the same category as those by the articles just named, whilst they still better illustrate the influence of personal tastes. It is obvious that those who decline all mushrooms, or by whom they are not obtainable, will never suffer, whilst it by no means follows that those who feed on them most freely always run most risk. If, however, a strong liking for mushrooms chances to be associated with inexperience in their selection then comes the special danger, and the first of these may be met with, possibly, in only one or two individuals in a family. It is just so with the appetite for tainted fish, it may be, and often is, eaten by only certain members of a family, the majority of whom, as a matter of taste, absolutely abstain.

A yet more close parallel with what occurs in leprosy than those just discussed is offered in the case of the fluke-disease in sheep. This malady is slow and insidious in its development. It may attack a few sheep in a large flock, the rest remaining in perfect health. It is well known to be associated with certain definite localities, and experienced shepherds will take the utmost care to prevent their flocks from visiting certain damp places which are reputed "to breed fluke." It is known that after a flock has inadvertently been permitted to go to drink at such a spot a certain number of the sheep will in the course of a few months, but not sooner, show signs of sickness. It is even said that single sheep which have shown a liking for wet places may sicken whilst the rest remain free. All this finds an exact parallel in the history of leprosy. Certain districts seem to produce it, and strangers who go to reside in them run a certain amount of risk. That risk appears to be very haphazard, and it is realised only by few. Often it is only one here and one there who suffers, but now and then the prevalence may be extensive. Very often no indications of the disease are observed until long after the locality where it was obtained has been left. Both the fluke-disease in sheep and leprosy in man, although usually fatal, are occasionally recovered from.

Now there is no longer any uncertainty as to the nature of the fluke-disease. It depends upon a parasite which breeds in its host, and which has spent part of its life in the body of a certain small fresh-water snail which often abounds in wet places. The cercaria of the fluke become attached to the blades of grass, and are so eaten by the sheep. It is not suggested that the sheep have any special liking for the snails. We have thus no difficulty in explaining the erratic incidence of fluke-disease nor in seeing how the greediest and most adventuresome are those most likely to suffer. If we might imagine an ovine religion which on one day of every week and on three weeks out of every year forbade to pasture on the uplands and left only the marshes free our parallel would be complete.

OBJECTIONS BY DR. BLACK AND PROFESSOR WOODHEAD ANSWERED.

My sympathies have for many years been deeply engaged for the five or six hundred unfortunates who are now prisoners on Robben Island. I have considered it my duty to express in the strongest terms I could use, and in the most open manner, my sense of the folly and injustice which are alike concerned in the maintenance of this cruel establishment. It did not, therefore, cause me any surprise to see that the visit of the British Association to Cape Town had been made an opportunity for putting forward some reply to my strictures. My only regret is that this reply was not made either through the same channel that the charges were brought, or that it was not submitted to some medical society in England. Either of these would have given me opportunity for reply. As yet I have no more detailed information as to the statements recently made at Cape Town than a newspaper report. From this I will quote.

> "Dr. Black read a paper on 'Leprosy, the distribution and the treatment of the disease in South Africa.' He strongly expressed the opinion that the disease was in no way due to the eating of fish. In the discussion which followed, Professor Sims Woodhead said that the most important point to which Dr. Black had drawn attention, was the eagerness of the Cape Government to take every precaution against the spread of leprosy, and for the amelioration of the lot of the lepers on Robben Island. It could not be too strongly insisted upon that the leprosy was an infectious disease, as had been shown by the case mentioned in the paper, in which leprosy had been found in native communities far removed from the possibility of a fish diet. He had himself been told, by a former pupil, of cases in Persia where patients have never seen fish in their lives. It should be thoroughly understood that

the confinement of lepers was not the outcome of an academic theory, but that the disease was due to the prevalence of the leprosy bacillus, which could apparently be directly communicated, and in no way depended upon diet."

Both Dr. Black and Professor Sims Woodhead are gentlemen whose opinions ought to carry great weight on any subject which they had studied widely. In the present instance they have done little more than express opinions, and the question arises as to whether they give proof of adequate investigation. If Professor Woodhead's view, as to what was most important in Dr. Black's paper, be correct, it would seem that no new arguments or facts were adduced. No one ever doubted the eagerness of the Cape Government to take precautions. The accusation is that this eagerness was based on error and panic. Nor has anyone doubted the willingness of the Government to do what is possible for the amelioration of the lot of the lepers on Robben Island. I have myself borne most willing testimony to the humane manner in which, under Dr. Black's supervision, that island prison was conducted. It is, however, but poor palliation for a mistaken conviction to allege that the victim would be treated kindly in his lifelong confinement. What he asks, and in the name of justice demands, is, that he be liberated and allowed to return home to his family.

Although both these gentlemen appear to have expressed strong opinions in favour of contagion and in opposition to the fish-hypothesis, neither, so far as the report goes, adduced a single fact either in support of the one or in opposition to the other. The suggestion that leprosy occurs in places where no fish can be had is futile for the simple reason that there are no such places. Let those who think that there are name them definitely. Professor Woodhead cites Persia, and, on the authority of one of his pupils, avers that there are those who have never seen fish in their lives. Possibly here the mistake is not recognising dried fish as being fish. I have collected evidence from many sources as regards fish-eating in Persia, and have been assured that there is no district which dried fish does not reach and where it is not highly relished. There is very little leprosy in most parts of Persia.

In making his *ex cathedrâ* statement as to infection, Professor Sims Woodhead has surely forgotten that husband and wife very seldom indeed are both affected; that in London and Paris no precautions are taken; that in all leper homes there may be found a few suffering from other complaints, and that so far as the facts go it would appear that these could not possibly be in any safer place as regards living free from leprosy.

LEPROSY IN COLOMBIA.

Since my chapter on leprosy in Colombia was printed off I have received much valuable information respecting it from Dr. Julio Manrique. This gentleman is a native of Colombia and has given much attention to leprosy, upon which his father, also a medical man, had written a treatise. He assures me that neither in Colombia nor the neighbouring countries of Venezuela, Panama, etc., are there any facts which would oppose the belief in the fish hypothesis, but everywhere much in its support. The disease prevails, he says, most near the coast or in districts adjacent to the Magdelena river, and in all these fish is largely consumed. It is also common near to the large lake of Maracaybo which furnishes much fish. The curing of the fish is chiefly by drying and is very imperfect. The salt on the coast is obtained by evaporation and is of poor quality; that from the mines is good but is subject to a tax, the mines being the property of the Government. It is the poorer classes who chiefly suffer from leprosy and they are rigid observers of the fast days, and during the forty days are largely dependent on cured fish. This article is carried inland, for fast-day use, into all parts and is often in very bad condition. My informant believes that into many large districts where there is leprosy little or no fish would ever find its way were it not for the demand created by the Catholic fasts.

DR. BLACK'S BRITISH ASSOCIATION PAPER.

Since what is written in pages 364, 5 and 6, was in type, I have received a much fuller report of Dr. Black's paper. From this the following is an extract.

"As indicating to some extent the increase and spread of leprosy in Cape Colony, though no doubt the figures are partly dependent on a more thorough application of sanitary enactments, I may quote some figures comparing the year of the census of 1891 with that of 1904. In 1891 there were 626 known lepers; in 1904, 1,230. This shows a considerable increase in Europeans, and other than Europeans. The increase in the total leprosy rate per 10,000 was 24·69 per cent.; the European increase was about 15 per cent.; and in other than Europeans about 25 per cent. The persons in the colony enumerated as leprous increased from 1891 to 1904 by 81 per cent., while the population increase was 57·5 per cent. The Hottentots and mixed races have the highest leprosy rate; the Europeans, the lowest. The Kaffirs and Bechuana have the, for them, high rate of 5·6 per 10,000. It need hardly be said that there is no evidence whatever that this continuous extension of the disease, geographically and numerically, is due to any particular form of diet, or racial or climatic tendency. In all the circumstances, fish, cured or uncured, or manipulated in any conceivable fashion, is about the last thing one would pitch on as approaching an explanation."

Without giving a too implicit credence to these statistics we may safely accept their general indication to the effect that leprosy, during the last fifteen years, has undergone an alarming increase in South Africa. As regards the original immunity of the Hottentot races and as to the direction in which leprosy has spread over the Colony Dr. Black corroborates what I had written.

> "Besides, the very habits of these people precluded their being subject to this disease. The bushmen were nomadic hunters, constantly on the move. The Hottentots were also largely wanderers, bringing their flocks of cattle from place to place, but never advancing so far towards settlement as to cultivate or till the soil; and, in this connection, it is to be noticed that those parts of the country which still retain the latest pure remnants of these nearly extinct peoples are the parts which, on the evidence of our own statistics, are practically free from leprosy. The spread of leprosy in this country has been from the south-west to the north-east, following indeed the tracks of the new civilisation, which progresses in that direction."

The statements quoted enable us to institute a most instructive comparison between Norway and South Africa in reference to the recent progress of leprosy. On the Norwegian Coast the disease is declining, whilst in the inland districts of Cape Colony and its adjuncts it is increasing. In neither can those who reject the fish-hypothesis offer any explanation whatever of these facts. In both countries laws have been passed of very similar character in the hope of suppressing the disease, and both are advancing in civilisation. There are, however, very noteworthy differences between the two. The laws enacted in Norway are of merely permissive character and have by no means led to increased segregation. Those in Cape Colony are compulsory and have led to a large increase of segregation. In Norway lepers have for the most part been left at their homes, a small minority only have been consigned to asylums, whilst in South Africa the most strenuous efforts have been made to secure and retain in durance every single leper. Thus it would appear that to pass inefficient laws and let them lapse is much more successful than the reverse and the supposed justification of such places as Robben Island fails utterly. How does the question stand as regards the advance of civilisation in the two countries? On the right interpretation of the facts on this head lies, if I do not greatly mistake, the solution of the problem. For the poor Norwegian fisherman civilisation has meant better food, more and better salt and the gross result has been a much reduced consumption of rotten fish. For South Africa civilisation has meant the quite new development of an active trade in half-cured fish and the easy transference of such fish by railroads to distant parts; the result has been a very considerable consumption of a very bad article at places far inland, and the development of leprosy along the lines of traffic. Further, it must be remembered that in South Africa mining operations in various regions have created an extraordinary demand for the article in question. Many facts go to indicate that it is from these centres that the disease has chiefly spread, more especially to distant parts, Natal, for instance.

I may perhaps be excused for again asking attention to the remarkable fact that all those who have recently written in opposition to the fish-hypothesis have inadvertently supplied very valuable facts in its support. Dr. Hansen* who repudiates it for Norway (without stating any semblance of an objection) is at pains to show that no other explanation is available, whilst admitting that the social condition of the Norwegian fishermen who suffer from it is undergoing steady improvement. Dr. Turner who rejects it for the Transvaal has laboriously collected statistics the main result of which is to show that the Kaffir race is comparatively exempt and it is precisely that race which has a repugnance to fish as food. Lastly, Dr. Black, whilst expressing in strong language his dissent from the doctrine in question, gives us very conclusive proof that measures based upon the belief in contagion and carried out with vigour have utterly failed of result, and whilst he thus discredits contagion, he admits that the disease has spread along the lines of communication with the fish-producing districts, that it was unknown in the aboriginal non-fish-eating populations and is still so where those populations retain their primitive habits.

*See *St. Thomas Hospital Gazette*, May and June, 1905.

APPENDIX.

PART II.

NOTES FOR A GAZETTEER OF LEPROSY.

The following pages have, it may be confessed, but little claim to the title of Gazetteer, but it has been difficult to find any other more appropriate. They contain fragmentary notes and references to sources of information as to leprosy, arranged in alphabetical order according to locality. They were compiled in the first instance for my own convenience, and my only motive for now printing them is the belief that they may possibly prove useful to other enquirers. The literature of leprosy is very large, and although much of it is the result of earnest and patient work, some of it is tediously detailed and not a little very worthless. It has not seemed desirable in the present work to give any Bibliography since we are dealing only with one aspect of the malady. The reader who desires it may, however, find good bibliographies by several authors, the best possibly in the Journal of the "Prince of Wales' Commission," from the pen of Dr. Abraham. In the extracts here given those only for the most part have been selected which refer either to the supply of fish in the district named or to the local prevalence of leprosy or to both.

Although, as stated, the literature of leprosy is very large, it is not easy of access. It is scattered through a multitude of journals and pamphlets, and but few of our libraries can boast of any large collection of its items. I have myself made and arranged for convenient reference a not inconsiderable number of extracts, and it has seemed best to indicate in the following pages the places where these may be found. Where the reader encounters a reference to "Extract Book" it is to be understood that it refers to my private collection. I shall at all times be pleased to afford access to these books or to answer questions respecting their contents. The references to "Roy. Col. Phys. Report" may always be verified in that document. The initials I. M. J. refer to the *Indian Medical Journal.* The references to "Papers" applies to a Blue book, so named, issued by the Indian Government at Calcutta in 1896 on the treatment of leprosy.

The abbreviation "Lep. Journal" refers to the Journal published by "The Prince of Wales' Commission," and to the latter body the term "Commission" always alludes.

Where the word "Vol." occurs without explanation, it refers to a series of bound pamphlets in my own library.

I may add that the "Extract Books" to which I have referred will, on the publication of the present work, be deposited for a time in the library of the Polyclinic Institution, 22, Chennies Street, together with a large collection of works on leprosy. A considerable part of the latter were a gift some years ago to that Institution of Dr. Phineas Abraham, the others are my own.

GAZETTEER, Etc.

Abyssinia.—Dr. Henry Blanc, in a paper published in the "Transactions of the Medical and Physical Society of Bombay," writes: "Leprosy is frequently met with in the vicinity of the Tana Sea. Is it to the fish-diet in such general use among the dwellers on the shore of the lake that we should attribute the localisation of this disease? Leprous beggars are often met with in large numbers, clubbing together and leading a jolly life." From Surgeon Kirk's Medical Report on the Kingdom of Shoa

(Abyssinia), in the "Transactions of the Medical and Physical Society of Bombay" for 1843, we find from an analysis of 400 miscellaneous cases, exclusive of syphilis, seen at Ankobar between December and April, 1842, that there were twenty-six cases of leprosy. It is added, "Leprosy is not considered contagious by the Abyssinians, nor do they hesitate to associate with those afflicted with the disease."

ADRAMPET (seaport in the Pattukotta táluk, Tanjore District, Madras Presidency).—The population is largely engaged in sea fisheries and salt manufacture. Of the inland trade, fish forms an important item, being sent from the coast as far as to Trichinopoli. A large (Government) salt manufactory also exists here, the salt marsh lying between the town and Point Calimere, being one of the most extensive in the Presidency, and producing salt of superior quality. It is one of the four fish-trade centres mentioned in the index to "Hunter's Gazetteer." There is no mention of leprosy. (Note the abundance of salt.)

ALMORAH (Almorah in Kumaun: see Lewis and Cunningham, vol. vi., 70).—Lewis and Cunningham write: "The history of this asylum gives no support to the doctrine that leprosy is a contagious disease, but strong evidence to the contrary." They advert to the circumstance that a contrary statement has got about, in order to say that it has not the slightest foundation. Nearly twice as many men as women. The Commission found 108—ninety-three Hindus, sixteen Brahmins, one Moslem. Into this district refugee lepers from Nepaul flock. At least one-fifth of the lepers in the asylum are from Nepaul.

ANDAMAN ISLANDS.—The following extracts are taken from the "Report on the Administration of the Andaman and Nicobar Islands, 1901-1902":—"One hundred and sixty-seven thousand four hundred and sixty-five pounds of fish were caught by the Government fishing gangs in the Settlement, and, with the exception of a small quantity sold to private individuals, the whole catch was issued to the labouring convicts as rations. There were thirty-seven patients in the Leper Ward at the beginning of the year; eight were admitted and eight had died during the year, leaving thirty-seven at its close."

Aracan.—Mr. R. M. Bernard, in the "Transactions of the Calcutta Medical and Physical Society," vol. iii., stated that "The Mughs, the natives of Aracan, are a muscular race. Their food is chiefly fish and rice, but they do not object to rats or snakes, or even the putrid carcass of an elephant."

Arcot.—Fish are caught in large quantities in the Mamandur and Kalavai tanks, 2,500 rupees being the annual fish rents of these reservoirs. (See back, p. 345.)

Argentine.—Dr. Ashmead writes that most lepers are in the province of Corrientes. He mentions Bella Vista, San Cosme, San Miguel, and says that the greater number of lepers live near great expanses of water. He adds, "It is also an old belief in that country that the cause of leprosy is the exclusive use of fish."

Assam.—The districts in Assam which are marked in Dr. Kanthack's map as showing steady increase since 1871 are, first, the three northerly ones Goalpara, Kammp, and Darrang; next comes Cachar, on the south-east. Other districts in which the increase has been recorded since 1881 are Caro, Sylhet, Nowgong, Lakhimpur, and Sibsagar. These districts are, with the exception of Caro, precisely those in which the tea-gardens are situated. In all the rest of Assam there has been diminution in prevalence since 1881. So far as can be judged, the cultivation of tea and the prevalence of leprosy are in mutual ratio. Respecting Assam, the best previous information which I can find is in the "College of Physicians Report," which records: "Leprosy is known in the district of Durung, Assam, but is not common. It has been recognised in one of its forms only, *Lepra mutilans*" (see p. 193). It is added that "the diet of the people is vegetable chiefly, with fish occasionally, and their occupation is agriculture." In the *Journal of the Leprosy Investigation Committee*, Mr. F. C. Daukes, the officiating secretary for the Chief Commissioner of Assam, reported that there was a general consensus of opinion that leprosy was tending to increase in the plains, but added that "the deputy surgeon-general and the Commissioner did not think so."

Badakshan (A district north of Afghanistan).—I saw in the Matonga Leper Hospital, Bombay, a man who was the subject of leprosy, and who had walked from Badakshan to Bombay in the hope of treatment. His journey had, I believe, occupied nearly a year. He was the only example of leprosy from that district ever seen in Bombay. None of the linguists who were present with me could speak his language, but we ascertained from him that there were other lepers in his district, and so far as we understood he denied having eaten fish. In Robertson's description of this district (see "Ency. Brit." vol. xxx., p. iv.) he writes: "All the rivers teem with fish."

BAHAMAS.—("Roy. Coll. Phys. Rep., 1867," p. 7; *Lep. Journal*, iii., 93.) Dr. Frank West (*Baltimore Med. and Surg. Journal*, October, 1890) says that in fifteen months he had seen seven cases.

BALASORE.—Balasore is a salt making district, but Hunter says of it, "The whole process is as rude and careless as can well be imagined."

BARBADOS.—("Roy. Coll. Phys. Rep., 1867," ix., 26.) "It attacks unsparingly the higher and the lower classes."—"Sea Coast and Inland": Dr. Carrington.

BAROTSE-LAND (Southern Zambesi).—Dr. Worthington writes me that one of his sons is a Commissioner there, and reports leprosy rife there among high and low, the son of the present king being a leper. It is universally believed by them that the disease is occasioned by the consumption of fish, more particularly of rotten fish, of which they appear to be very fond.

BASUTOLAND.—Salt scarce, fuel scarce. One hundred and forty-eight cases of leprosy: ninety-three males, fifty-five females. No segregation. Pop. 218,902. One leper to 1,479.

Twenty-eight per cent. immigrants from Griqualand East and other parts. Fifteen were suffering before they came into Basutoland (Dr. Long's Report, June, 1895): "Many reputed cases of leprosy were found to be severe manifestations of tertiary syphilis."

There is no native word for leprosy in the Basuto language. The belief is that the disease is new within the last half-century. (Extract, Bk. I., p. 129; II., p. 93.)

Benares.—(See Papers, 102, and "Roy. Coll. Phys. Rep., 1867," p. 167.)

The Commission saw thirty-six lepers collected at the Secrole Dispensary; four others were not lepers. Twenty-six were Hindus, six of whom were Brahmins and two Moslems.

Bengal.—("Roy. Coll. Phys. Rep., 1867," pp. xviii., 118, 133 and 200.) Dr. Jackson remarks (p. xviii.) that "Leprosy is known in the province of Bengal, and generally throughout India, though not so extensively in the upper and midland parts of India as in the lower provinces, and especially in the districts bordering on the sea."

Mr. Vincent Richards contributed to the *Indian Medical Gazette*, September, 1889, the results of an elaborate enquiry as to the relation of leprosy to the consumption of fish in Bengal, Behar, Orissa, and Assam. His enquiry was, however, based on the mistaken assumption that the amount of fish consumed, as indicated by the number of fishermen or fishmongers, in any given district ought, if the fish-hypothesis were well founded, to be in ratio with the prevalence of leprosy. This assumption leaves out of view the fact that the quality of the fish eaten is of far more consequence than the quantity.

"The great rivers of Bengal support a numerous race of boatmen, and the craving for fish among a people—to most of whom other animal food is interdicted, either by scarcity or prejudice—employs as large a number of fishermen." "Modern Hinduism," by W. J. Wilkins, of the London Missionary Society, p. 176. (See chapter xxv. of present work.)

Bergen.—H. Vandyke Carter made the following statement in his brilliant report of 1873: "This town is free from the disease, and as a rule, populous localities do not seem to be foci of the affection." (See chapter xxvi. of present work.)

Bokhara and Turkestan.—A disease, locally called Mukkow or Kolee, is described as being fearfully common in the district of Samarkand, and the neighbouring states of Stuhr Sabz and Hissar. The disease would appear to be leprosy, and is by the inhabitants attributed to a curse from God. They drive the unfortunate sufferers from them, and a separate portion of the city is assigned for their residence. It is said to be hereditary, and is believed to be caused by particular sorts of food. (See paper 459, Appendix, vol. vii., "Calcutta Med. Phys. Trans.")

Bolivia.—Little or no leprosy.

Bombay.—("Roy. Coll. Phys. Rep., 1867," pp. xvi., 108, 125, Summary on p. 115.) (See back, p. 337.)

Mr. Lisboa, in 1854, collected some observations on leprosy as he had seen it in the Jamsetjee Jejeebhoy Hospital at Bombay. He had observed twenty-eight cases. Of these, twenty-one were males and seven females. The Hindus numbered twenty-one, Portuguese four, Parsees two, Mussulmen two, and one Indo-Briton.

As regards the cause of the disease Mr. Lisboa thought that it could be traced in many cases to bad food, such as salt or oily fish. The preponderance of Christians in relation to their relative numbers in the population of Bombay is very noticeable. The actual number is more than double that of the Mussulmans, whilst it is nearly a quarter that of the Hindus. He adds that "there was no instance in which the propagation by infection could be traced."

Brazil.—(See "Coll. Rep.," 43 and 44; see also *Lep. Journal*, iv., 19.) It was common in Rio formerly (1750). Leper Hospital founded in 1760; subsequently a new one to receive 200 patients. Its numbers have never exceeded eighty-six. In 1891 there were sixty-six: forty-six men and twenty women.

The Indians who live away from the towns are exempt. Dr. Lewia writes: "Throughout the whole country, in fact, this terrible disease is still rife." He denies that the etiological factors usually quoted are sufficient to explain the facts. He thinks that there are more than 300 in the city of Rio itself, many of them from the country. The better classes are not wholly free. Males predominate, but not very greatly. The population is Catholic. (See back, p. 307.)

Burma.—In Burma it is believed that the disease is more common in the east than the west, and that it is declining.

The census of 1891 gave a total of 6,464. That of ten years later, 4,190, or eight per 10,000. (See back, p. 323.)

Cairo.—("Rep. Roy. Coll. Phys., 1867," p. 53; see pages 323 and 335 of present work.)

Caledonia, New.—(See New Caledonia.)

Calicut (Bombay).—The asylum is on the seashore. The Commissioners saw twenty-seven patients, but one was not a leper. "Fish is a common article of diet." Elephantiasis is common, and the Commission were shown cases of "a peculiar macular discoloration of the skin quite distinct from leprosy." Of this they saw ten or twelve cases.

California.—In the 4th Annual Report of the State Board of Health, Massachusetts, the following sentence appeared: "A leper-hospital has been established at San Francisco, and fifty-two cases have been admitted in ten years (1874—83), all of whom with a single exception were Chinese; and no case has been reported of a native citizen of California acquiring leprosy."

Canada.—(Extract, Bk. I., p. 149; see also page 325 of present work.)

Canton.—("Rep. Roy. Coll. Phy., 1867," p. 75. Mr. Cantlie's prize essay.) Leprosy and fish-eating abundant; salt taxed.

Cape Breton.—Several cases in Englishmen on Cape Breton Island, Newfoundland.

Caseama Tribes.—Leprosy and much fish-eating.

Caspian District.—Dr. Münch has written a valuable work on leprosy in the district of the River Terek, which flows into the Caspian Sea, north of the Caucasus. It proves that leprosy is common there, and it is a fishing district. (See chapter on Russia.)

Cawnpore.—Very few lepers. Ten seen by the Commission: nine Hindus (three Brahmins), one Moslem.

Central India is north of the Central Provinces and east of the Bay of Cutch, lat. 23° to 26°. No complete returns as to leprosy; but it is believed that there is very little. Population 9,451,376; ratio ·08. (Indore, Nemuch, Gwalior.)

Central Provinces, India.—No return had been received for 1891 at the time of the Commissioners' Report.

In 1872, Western, 4·1; Central, 1·7; Eastern, 3·6; for the whole population, 1872, 3; 1881, 6·5. Thus there is suspicion of increase. The figures given refer to the ratio per 10,000.

Chaltis Garb (including Bilaspur).—Leprosy believed to be increasing. There is a great deal at Bilaspur, and the census returns believed to be much below the real number. In this district are the Satmanes, who abstain from flesh and have but little leprosy. (See Comm. Rep., p. 128.)

Chili.—It is rare. Dr. Leckie assured me from personal experience that it was not met with in Patagonia, nor did he think it at all common in Chili, Peru or Bolivia.

China.—(" Rep. Roy. Coll. Phys., 1867," pp. xiv., 72.) See Dr. Newman's prize essay, but note that the extracts from Doolittle's work which are supposed to describe leper-hospitals at Teintsin really refer to Hongchou. Extract, Bk. I., p. 141; Extract, Bk. II., p. 5; Mr. Cantlie's prize essay. (See back, p. 127.)

Chittagong (Hill district).—No leprosy and no fish-eating. (Richards.)

Churra District.—I have been told many times that fish is not to be had in the Himalayan districts. Let me answer by an extract from Sir Joseph Hooker's " Himalayan Journal " (Bettany's edition, p. 510): " On the Kalapance road, which we followed, we passed crowds of market people laden with dried fish in a half putrid state, which scented the air for many yards; they were chiefly carp caught and dried at the foot of the hills." After mentioning that some carried cinnamon, he adds: " The smell of the cinnamon loads was as fragrant as that of the fish was offensive." This was in September.

Cochin.—Native State in subsidiary alliance with the British Government, and politically connected with the Presidency of Madras . . . . and included within the limits of the District of Malabar. A fish-trade centre. " The Vallamars, who live by fresh-water fishing, number 4,000. (Total population in 1875, 601,114.) But the sea fisheries are monopolised by the Marakan caste, who are more numerous. A considerable trade in cured fish is carried on along the coast, emigrants from Ceylon coming over annually to engage in it during the fishing season. . . . . Among endemic diseases elephantiasis, leprosy and skin diseases are specially frequent."—"Hunter's Gazetteer."

Colombia, United States of: Bogota.—The following facts were supplied to me in 1870 by my late friend, Dr. Fergusson, of Clermont Square. Our conversation had begun by Dr. Fergusson telling me that there was leprosy at Bogota, although it was far above the sea and out of the way of sea-fish. He had lived there some years. Bogota is the capital of New Granada, and is 8,000 feet above the level of the sea, three days' journey from the River Magdalena, on the banks of a small stream, Bogota. A large inland lake supplies fish in plenty. They eat a peculiar fish, "like an eel but swims as a fish, which is believed to be unwholesome. It tastes like an eel if fresh. They eat also largely salted 'vagra,' a large flat fish, very coarse; especially during Lent this is what they live on. There are a few cases of leprosy." Dr. Fergusson had seen a few cases, perhaps half-a-dozen, during two years." The natives consider it hereditary. It is in a few families only. The population consists of Europeans (very few), descendants of the Spanish, once numerous occupiers of the country, and some of mixed race, Indian and Spanish. In one of the Spanish families leprosy occurs. There is no leper-house. In Ambelama, on the banks of the river, a tropical climate, they eat immense quantities of fish, and leprosy is much more common. (For more recent facts see chapter xxviii. of present work and Appendix, Part I.)

Constantinople.—("Roy. Coll. Phys. Rep., 1867," p. 70.)

Crimea.—(Extract, Bk. I., p. 119.)

Cuddalore (S. Arcot, Madras).—A letter from Dr. Arputhasanie to me when I was in India, states:—"Leprosy is more prevalent here than one would like to see in so small a place. There are two or three lepers in the street in which I live and they are all fish-eaters." From "Hunter's Gazetteer" we learn that there are a considerable number of native Christians, 1,510, chiefly Roman Catholics, in the town of Cuddalore.

Ceylon.—Dr. Haydon White writes me: "A man recently returned from Ceylon tells me that there the disease is generally ascribed to the eating of rotten fish, which the natives curry and eat freely." (See Mr. Caine's statement above.)

Cuba.—(Extract Bk. I., p. 152.)

Cyprus.—Tradition says that it began 300 years ago in the Monastery of Troöditissa, having been brought by pilgrims.

Sir Henry Bulwer writes (August, 1889): "I find it difficult to believe that a disease, which has been known to exist in these Eastern countries from time immemorial, never found its way into Cyprus till three centuries ago."

Dr. Heidenstam states: "The disease is not met with in villages which are exclusively Turkish, although the sanitary conditions and the poverty are just the same as in the Christian villages." He adds: "As far as religion goes, Christians and Moslems are both susceptible to the disease, although the latter have been affected in remarkably small proportion in comparison with the former."

In the leper-asylum, of sixty-one cases three only were Moslems. It is supposed to have decreased since the British occupation began, and the number at present affected is estimated at 100. At the time of the beginning of British occupation, of the 667 villages thirty-three had lepers and a total of 150 cases was known. Marathavuono and Acanthou are mentioned as villages specially affected. There is a segregation-farm, but the high road from Nicosia to Larnaca runs right through it. It is fenced with wire fence on its outer sides but not on the parts where the road crosses it!

Dakota.—(Extract Bk. II., 159.)

Damara District.—Galton in his account of the Damara region of South Africa, 1852 (Walfish Bay), mentions neither leprosy nor fish. The Damaras consume milk (sour) very largely, and some meat, mutton, beef, and game. They live almost entirely on milk and pignuts, drinking one to two gallons a day. These statements may be presumed to be applicable to the original Hottentot tribes of the Cape (see p. 144.)

Damascus.—("Rep. Roy. Coll. Phys., 1867," pp. 56, 57.) (See Syria.)

Darjheeling.—The Commission were shown seven cases, but in three only was the diagnosis sustained. They found the consumption of dried fish, as a flavouring, almost universal. In the bazaar dried fish was "a common article of sale." (Refer to Hooker's "Himalayan Journal," p. 92.) I visited Darjheeling in 1903 but was not shown any lepers. Although at the foot of the Himalayas there is a fair supply of fresh fish.

Dejarat.—Dera Ismail Khan.—No lepers in the district. A few frequent a shrine of Pir Jeharrva, three miles from Druzaffargarb, otherwise the disease is unknown. (Papers 166, 170, 171.) "None of the lepers have had leper relatives."

Delhi.—No asylum. (See papers, p. 134.) From Hissar no increase reported. In other parts slight increase thought possible, but prevalence low.

The Rehtath districts have 171 lepers, male 151, female 20 The Commission saw 12 reputed cases but rejected the diagnosis in one of them. Six were Hindus, all of low caste, and five Moslems. All admitted that they had been frequent fish-eaters.

Demerara.—("Rep. Roy. Coll. Phys., 1867," p. 45.)

Dominica.—("Rep. Roy. Coll. Phys., 1867," p. 21.) "The disease is known but not very common. During a residence of thirty years few cases have come under my notice."—Dr. Imray.

Faroe.—(See letter from British Consul, "Leprosy" II., Extract Bk. I., p. 29.) "I find the cause of leprosie to be the air and the dyet: for here is a pretty cold and moist air, &c., &c. . . . Besides, the meat of all, especially of the poorer sort, is half rotten flesh or fish, all their nourishment in summer being likewise fresh fish and sweet milk without any salt."—"Debes' Account of the Feroe Islands" (1676).

Since the abandonment of the deep sea fishing, leprosy has become unknown.

Fiji.—"Malaria is unknown in Fiji, but there is plenty of leprosy there."—Sir W. Magregor Cantlie's Essay, p. 386.

(See vol. I. of *Leprosy Journal*, p. 94.)—"Lepers were formerly killed privately, and their number is believed to have increased since this form of segregation was discontinued. Dr. Corney thinks that there are more than is generally supposed."—(Extract Bk. I., p. 145).

Formosa.—(" Rep. Roy. Coll. Phys., 1867," p. 79.)

France.—(See Paris and Extract Bk. I., 123.)

Fyzabad and Ajodhya.—The Commission saw eighteen lepers, one of whom was a Brahmin.

Gold Coast.—Extract from Captain Moloney's paper on West African Fisheries, in vol. v. of the Literature of the Fisheries Exhibition:—" Dr. Clarke, who was colonial surgeon on the Gold Coast and surgeon to the natives, in his medical report for 1858 has dwelt on the food question as follows: 'Elephantiasis and lepra (leprosy) in all its hideous forms prevail. The natives suppose it may be induced by drinking excessively of palm wine, which has been mixed with the juice of the bamboo; but it may, with much greater reason, be accounted for by an excess of fish diet . . . . The food of the mass chiefly consists of vegetables and fruits, with fresh fish and dried fish in excess, often so highly ammoniacal as to be commonly known under the name of " stink fish," with land-snails and land- and sea-crabs. But their principal dish is composed of fish.

Grenada, West Indies.—(" Rep. Roy. Coll. Phys.," p. 34.)

Greece.—Zambuco estimated the number of lepers in Greece at four hundred.

Guiana, Dutch. (See Surinam.)—Seclusion has been rigidly tried. (See " College Report," xlvi.)

Guiana, British.—(" Rep. Roy. Coll. Phys.," pp. x. 42, 213.) (XLVI., see further on.) Dr. Hillis's work, " Leprosy in British Guiana," 1881, is very valuable. The most recent allusion to this country which I possess is the following:—In the last number of the " British Guiana Medical Annual," 1904, Dr. Ozzard writes: " Leprosy is exceedingly common here. Salt-fish is universally adopted as a common food amongst all classes, and at times it is undoubtedly eaten when not in a fit condition."

Gya. (See Behar, Bengal.)—Leprosy occurs. (Hunter.)

Hawaii.—(Extract, Bk. I., p. 5.) (Chapter xxix. of present work.)

Havana.—(Extract, Bk. I., p. 153.)

Hissar.—(See Papers, 134.)

Honolulu (Sandwich Islands).—Report by Dr. Lutz, 1890. (See No. 1 of "Leprosy Commission Report," p. 97.)

According to Dr. J. Ashburton Thompson, chief medical officer, Sydney, New South Wales, who has analysed the subject of Hawaiian leprosy most thoroughly, these islands were, without doubt, leprous long before the advent of the Chinese. (See pages 229 and 232 of present work.)

Honduras and Turk's Island (West Indies).—Leprosy unknown (?). F. L. Davis, colonial surgeon, in his report for 1900 (see "Selections") does not mention leprosy. British Honduras has a population of 36,000 (1900), mixed Negro descent chiefly.

Hong Kong.—("Rep. Roy. Coll. Phys., 1867," p. 221; also Cantlie's prize essay.)

Hoshungabad (Nerbudda).—Leprosy not very prevalent, and supposed to be decreasing. (Papers, 216.)

Hyderabad. (See Nizam's Territories; see Berar.)—"(Rep. Roy. Coll. Phys., 1867," p. 187.) Commission saw thirty patients, but rejected nine as not lepers; for the city, one per 10,000. Hindus suffer more than Moslems.

Iceland.—Dr. Henderson, who travelled in 1814, reported four leper-homes. In the present day there are none. In 1800 there were reputed cases to the number of 150 in a population of 50,000; that is, thirty per 10,000. The Rev. W. T. McCormick, in 1871, was told that there were but twenty-five in a population which had increased to 72,000; that is, something more than three per 10,000. (See important statements by Dr. Wyman, U.S.A. Extract, Bk. III., p. 1; also Dr. Ehler's prize essay.)

Indies, West.—("Rep. Roy. Coll. Phys., 1867," p. 18.)

Indore. (Native State in Malwa, Central India.)—Hunter mentions a leper-asylum.

ITALY.—Almost unknown in Celsus' time. It prevailed somewhat subsequently, but was noted as rare by Beniveni of Florence in the sixteenth century. During the sixteenth century it became confined to a few districts. (Extract, Bk. I., p. 127.)

IONIAN ISLANDS.—("Rep. Roy. Coll. Phys., 1867," p. 65). "It is known in Corfu, but is rare; it appears principally in villages in the mountainous parts of the island, and more rarely in the towns and in the plains."

JAMAICA.—("Rep. Roy. Coll. Phys., 1867," pp. ix., 65. Extract, Bk. I., 153.)—All agree that the Jews in Jamaica suffer severely, and some allege that not only are they great fish-eaters, but often eat it in a state of decomposition.

JAPAN.—The Japanese are fond of raw fish, and Dr. Albert S. Ashmead says that this custom has a value in defining the etiology of leprosy. (See *Journal of Leprosy*, iii., 91, "Fish Diet and Prevalence of Leprosy." Extract, Bk. I., 64.) (See back, p. 326.)

H. Ernest Schmidt, M.D., *Medical Record*, July 1st, 1869, writes: "Fish, which figures next to rice on their diet list, becomes, under some circumstances, a fruitful source of disease. It is prepared too often so as to be unfit for the stomach, as the above-mentioned rice cake. And in some very poor communities the people eat it after it has become half decayed; nay, they scarcely can consume it at all except thus damaged, since their poverty does not permit them to purchase the more expensive fresh and sweet article. I am convinced that to it must be attributed in a great measure the production of so much leprosy found in those very places. In my inquiries after the existence of leprosaria I could only learn of one, at Miaco, the great city of Nipon, where the supreme Mikado resides. This institution is supported by the people, independent of the government. There the lepers receive medical treatment. These miserable beings are very numerous in Miaco, very scarce in Nagasaki, but count largely again in Amakura, in Omara, and Ch'Kngo. In the latter place, built upon the low, marshy banks of a river, which, in its frequent inundations, leaves constant large pools of water standing between and underneath the houses, the people live on nothing else but this cheap, because damaged, dried fish, and hardly a single family can be found there free from leprosy. In Nagasaki leprosy is only sporadic; in all the other named places it is decidedly endemic."

JAVA (Batavia, the capital city).—Leprosy not very common, and in the main affecting the Chinese coolies. (See Cantlie's essay.)

JERUSALEM.—(*Leprosy Commission Journal*, No. 2, 1890, Nov., p. 91.) Report by Dr. Wheeler. Said to be forty or fifty lepers in Jerusalem itself; twenty-two in the Asylum "Jesus Hilfe." Dr. Wheeler says: "Notwithstanding the discovery of the bacillus, I do not believe it to be contagious in the true sense of the word." (Extract, Bk. I., 143.) (See PALESTINE.)

JHANG.—(See Papers, p. 155.)

JUBBULPORE.—(Sangor "Papers," 209.) Colonel Brooke reports that all believe that the disease is not increasing.

JULLUNDAR (Punjab).—The civil surgeon, who has a large asylum under him, thinks it slightly on the increase. (Papers, 139.) (See "Papers," 141, 149.) (See back, p. 345.)

KASHMIR.—Population in 1901, 1,157,759. Ninety-three per cent. are Moslems, and the rest Hindus. (Extract, Bk. I., 37, 137.)

KASSALA.—Colonel Henry told me that it had been necessary to make arrangements for lepers at Kassala. He thought that there was not much fish-eating there, but he believed that most of the lepers were immigrants from Abyssinia.

KHANDIVA.—(Papers, 214.) Opinions divided as to increase.

KANGRA.—Is reported as having increase. Dr. Carleton, of Aui, is referred to. (Papers, 145.)

KARPURTHALLA.—A small colony of ten lepers here. All Moslems.

KHALAPUR.—"Sajgaon, three miles south of Khalapur, has a shrine of Vithoba, where every November (Kartik) a fair is held, which lasts for about fifteen days, and is attended by about 2,000 persons, chiefly Agris, Kunbis, Thakurs, and Kathkaris. Shopkeepers from Talogaon, in the Deccan, and from Kalyan, Chank, and Pen, make large sales of cloth for dry fish . . . (Footnote: So large is the sale of dry fish that the god is called Dry Fish, or Bombil Vithoba.)."—*Bombay Gazetteer.*

KUMAUN.—Hunter says: "Leprosy, affecting four or five per 1,000 persons, is most prevalent in the east of the district. There is an asylum at Almora for those suffering from this disease." (Compared with Norway by Heber. See Lewis and Cunningham, p. 24: They estimate the Lepers of Norway as twelve per 1,000, and say that of Kumaun is higher. Thinly populated, Kumaun has one-third the population of Norway.) Surgeon-Major Francis writes: "I have seen leprosy in Kumaun, and though fish, from its comparative scarcity, is not an ordinary article of diet in those hills, *it is available*." He adds: "It will be advisable to thoroughly investigate the putrid fish view." (See Papers, 99.)

There are only two castes in Kumaun, Rajputs and Domes; the former agricultural, and the latter in trade, etc.

The Bhotias of Tartar descent living in North Kumaun are free. (See TARTAR.)

Lewis and Cunningham give a map of the Kumaun district, and estimate the lepers at 1,000. (See ALMORAH.)

Many leper-refugees from Nepaul reside in Kumaun, in order to gain British protection.

The district is about as large as Wales. It is mountainous, and crosses the Himalayan range.

It has been under British rule for more than eighty years. The inhabitants are mostly of Hindu origin, except in the northern extremity, where they are of Tartar descent and known as Bhotias.

Lewis and Cunningham do not say anything definite as regards the fish hypothesis, but apparently assume that it can hardly apply, on account of the comparatively small supply of the article. They exclude contagion, but suspect inheritance, and suggest local peculiarities of habits, etc. If the data given are trustworthy, "the phenomena (*i.e.*, leprosy) must depend either on peculiar local or hereditary conditions." This comes very near to saying that it must depend on food, especially when we remember that one race, the Bhotias, are free.

In 1889 Surgeon-Major Hutcheson stated that the district census showed 789, or 19·4 per 10,000 in 1872; and 1,039, or 21·0 per 10,000 in 1891. He infers that there must be some cause other than heredity to explain this increase.

Konkan.—Dr. Vandyke Carter, in 1867, gave, in a Government report, a leprosy map, which showed a great prevalence of the disease in the Southern Konkan. He estimated it as twenty per 10,000. He mentions a not very inconsiderable number as occurring in Jains and Lingaluts. In this he is an exception to all other observers. In no department did he find that it was less than five per 10,000; in some it was ten. A table published by Messrs. Lewis and Cunningham in 1877 (I.M.J.), gives a much higher estimate of prevalence than any other; whilst curiously, the Konkan, which Carter found so high, stands with them much lower than some others. These figures must be taken with great reserve as the occurrences of famine may have disturbed the statistics.

Lahore.—(See Papers, 157; Papers, 128; "Rep. Roy. Coll. Phys., 1867," p. 170.) No asylum, and but little leprosy.

Lisbon.—(Extract, Bk. II., 106, 107, 301.)

Lucknow.—(See Papers, 92, 93.) No leper-asylum. The Commission found fourteen lepers in the poorhouse. Six were Moslems.

At Unao, in the Lucknow district, Hunter states that leprosy is met with. It is not far from the Ganges.

Ludhiána (Umballa district of the Punjab).—The Civil Surgeon Bragwan Dar writes, 1889 (see Papers, 149): "The majority of cases of leprous disease occur among the lowest and poorest of the people, who live chiefly on unsound pulses and fish diet, and most of the Muhammadan residents of this district live so."

Bragwan Dar mentions a small village of lepers, a mile from Ludhiána, where all are Moslems.

Two pundits corroborate, and say that leprosy is more prevalent amongst low-class Moslems, "on account of their not being careful in their food" (Papers, p. 151).

Madeira.—("Roy. Coll. Phys. Rep., 1867," p. 48; Extract, Bk. I., p. 59.) Dr. Goldschmidt writes: "Fish enters into their aliments on a comparatively small scale" (see below). Many cases come from Demerara where there is a large Madeira colony.

Men in proportion of two to ten of women. Phthisis a common cause of death. No phthisical subjects catch leprosy.

Dr. Goldschmidt opposes the fish theory by the allegation that more suffer inland than on the coast. He considers that the disease is both hereditary and contagious, but that a chief influence is innutritious food. He thinks that "*abundant food, and especially meat, with moderate quantity of alcoholic drinks and cleanliness, will soon produce the good result of diminishing and ultimately making this loathsome disease completely disappear.*" The italics are his. The Hospital statistics go back to 1830. From 1840 to 1861 the average under treatment was twenty-four. Since 1861 the number has steadily diminished, and during the last fifteen years only one or two have been admitted annually.

Yet Dr. Goldschmidt estimates the proportion as six to 10,000.

This is perhaps only a guess; he allows ten times as many for the island as there are inmates of the Leper-Home, and there were seven at the date of his report (September, 1891). The Consul-General had reported "only five inmates" at the same date, and "that the lower classes are chiefly subject to the disease, principally fishermen and their families; and it is a curious fact that these people's food is almost entirely composed of salt fish, which is often in a state of decomposition."

The following is an abstract by Dr. Ashburton Thompson, and is taken from the account written by Dr. Jules Goldschmidt, whose personal researches were "poursuivies d'une façon ininterrompue dans cette île depuis 1866." "On the island of Madeira all lepers were never isolated, though about the year 1500 a lazaret was established to which poor lepers only were forcibly removed from all parts of the island down to 1860, and since 1860 all lepers have been entirely unrestrained. The people themselves do not regard lepra as a communicable disease; they ascribe its occurrence to use of a certain vegetable, and in consequence regard it with perfect indifference, and live in quite ordinary contact with the sufferers. The area of the island is about 780 square kilometres, and its population about 130,000, so that density is uncommonly high. It may be taken that about two-thirds of the close-packed population, or about 80,000 of them, livo in *la misère*, and their state has for long past been steadily going from bad to worse."

The author reckoned the total number of lepers present on the island in 1894 at 70. (See also *Polyclinic Journal*, 1902.)

MADAGASCAR.—("Rep. Roy. Coll. Phys., 1867," p. 220; Extract, Bk. I., 91, 199.) Mr. John Rogerson wrote me that he had formerly been a trader in the interior of Madagascar. He asserted that "certainly *no* salt-fish is consumed in Madagascar, and there is much leprosy." He spoke chiefly of the central plateau.

He thought leprosy most common amongst the Betsileo and Hova natives of the central plateau, and that there was none or very little on the coast. "Up in the interior there are large leprosy settlements under the guidance of various missionary societies or of the Government." He mentioned Yianorantzoa, in the Betsileo province. He spoke of having seen a leper selling rice in the market.

Mr. Rogerson's statement that "salt-fish or the curing of fish amongst the tribes of Madagascar is not known" is open to some doubt. It may be the fact that it is because these arts are very imperfectly known that leprosy occurs. Other authorities assert that the drying of fish is well known (see Dr. Wilson's article in *Friend's Examiner*). Dr. Wilson, who, partly at my suggestion, examined the details on the spot, wrote: "My own observation has led me to see that dried fish is very extensively used by the common country people." (See his paper in the Extract, Bk. II., 27.)

I have had similar information from several other missionaries.

MALABAR.—Dr. Cleveland, writing from Malabar in 1863, stated that leprosy in both its forms was seen in every public bazaar and thoroughfare. He added that "the doctrine of contagion is, in these days, wholly exploded."

MADURA.—No asylum. The Commission was shown 123 patients, of whom ten were not lepers. "Leprosy is an endemic disease on the coast."—(Hunter.)

MALTA.—(Extract—Bk. I., p. 99.) There is a Colonial Office Report on Malta (recent). Only nineteen cases in the whole island. (Dr. Portello Carlione.) No leper-home. All Catholics, and accustomed to use fish freely.

MADRAS.—("Rep. Roy. Coll. Phys.," pp. xvii., 100.) The reports show a steady reduction in most districts.

	1872.	1881.	1891.
Malabar Coast...	6·6	6·3	5·6
South Central	2·5	2·8	·8
Central	3·4	2·5	1·5
East Coast North	4·0	4·9	4·8
East Coast Central	3·7	3·6	2·7
East Coast South	5·8	5·9	4·2
Southern	2·9	4·1	2·1

Total population, on which these figures are based, 38,471,281. Ratio per 10,000 of whole population, 1872, 4·4; 1881, 4·6; 1891, 3·5. (" Rep. Roy. Coll. Phys.," pp. xvii., 100.) (See back, p. 347.)

MEDITERRANEAN.—(" Rep. Roy. Coll. Phys., 1867," pp. xii., 55.)

MEERUT.—The Commission was informed that at Garhmukteran, twenty-five miles from Meerut, on the banks of the Ganges, leprosy was common.

MEMEL.—(Extract—Bk. I., p. 7.)

MEXICO.—(Extract—Bk. I., pp. 148, 181.)

MEXICO, NORTH.—Artiaga, in a district of Chihuahuan, is a mining village up in the mountains; elevation, 4,000 feet. An old Jesuit mission; all Catholics, but no resident priest. It is a village, and does not contain more than fifty families. It is the leprosy focus, but cases occur scattered in the district. Many cases do not advance to a severe stage. Some have had symptoms twenty years, and do not recognise it as leprosy. Some fatal cases; no precautions taken. When they do get fish it is salt-cod; but not much reaches the place. Dr. Fenn gave me in conversation the above items of information.) (See back, p. 308.)

MINNESOTA.—In the report of a medical meeting (U.S.A., 1904), at which leprosy was discussed, we read—Dr. Tripp stated that there were twenty-five or thirty patients in Minnesota, all of whose addresses were kept by the State Board of Health. No attempt is made at treatment. They are all adult Scandinavians.

MOLAKAI.—(*British Medical Journal*, Nov., 1901.) Dr. Reynolds, superintendent of the Molakai Leper Asylum, says that leprosy is slowly but surely being eradicated in the Hawaiian Islands. Five years ago there were over 1,300 inmates at the settlement, but when the annual visit was made there were barely 900; "a result not brought about by scientific treatment, but by the gradual extinction of the native race."

MOOLTAN.—Leprosy rare. No case found for the Commission, and the civil surgeon, during the last three and a half years, had not seen a single case.

MONSERRAT.—("Rep. Roy. Coll. Phys., 1867," p. 18.)

MYSORE.—("Rep. Roy. Coll. Phys.," p. 188.)

NARSINGPUR (Nerbudda Division).—The general belief is that the disease is not on the increase. "There are very few persons in this district who are suffering from that form of leprosy which is contagious and dangerous. There are more of that kind which merely whitens the skin" (leucoderma). (Colonel Bloomfield, Papers, 212.)

NAGPORE.—("Rep. Roy. Coll. Phys., 1867," p. 186.)

NAINI AND ALLAHABAD.—Thirty-six were collected for the Commission from the jails. One Brahmin and one Burman.

NAINI TAL.—Only two cases seen by the Commission; both Hindoos. Not common.

NAGPUR (Central Provinces).—(Papers, p. 19.) Dr. Richardson speaks doubtfully of the census returns, which, as he says, record a startling increase. He speaks of "the effectual if cruel methods known to be adopted by native rulers in dealing with lepers," and suggests that their disuse under English rule may have caused an apparent increase. Colonel Bowie writes (Papers, p. 200) that the supposed increase may have arisen from confusion in diagnosis, and adds: "My own impression, as regards Nagpur itself, formed, however, merely on the number of afflicted persons I meet in the streets, as compared with twenty years ago, is that both leprosy and elephantiasis are decidedly decreasing." (See Bhandara, Jubbulpore, Balaghat.)

The Commission thought that the disease was very prevalent, and saw 174 patients. They remark that Moslems seem to suffer more than do Hindoos. About thirty or forty Brahmins are said to be lepers; this probably applies to the district. In this district fish (meaning, no doubt, fresh-fish) is "a great luxury," as the rivers yield but little. Nagpur has a leper-asylum. (Hunter.)

New Zealand.—Dr. Bakewell, of Auckland, is disposed to doubt Dr. Ginder's statement as to leprosy in natives. The importation of cases from the Sandwich Islands said to be not improbable. (*Leprosy Journal*, IV., p. 70.) For Dr. Ginder's report, see *Leprosy Journal*, II., p. 153. He lived at Rotorna. He thought that there were a few lepers at different places along the coast.

An early account of the New Zealand leprosy may be found in the *British and Foreign Medical Review* for 1854 by Dr. Johnson, late Colonial Surgeon of Auckland. (See also a pamphlet on "The Southern Districts of New Zealand," by Dr. Shortland, London, 1851.) Dr. Johnson gives a coloured portrait of a New Zealander. It does not indicate disease of any other part than the hands, although the man had been ill two years. It states, however, that the man's body had been covered by an eruption, and that his lips, nose, and forehead were all swollen, and, further, that he had lost his eyebrows, eyelashes, whiskers, and beard. It is said that there was so much swelling of the features that it was difficult to distinguish them. The portrait, however, shows not a trace of this disfiguration, and might interest General Robley as a good exhibition of tatooing. The description must, however, be supposed to imply leprosy. The disease, at that time, was supposed to be already rapidly declining, the natives believing that the introduction of Christianity had averted the wrath of the gods. Most of the cases which Dr. Johnson had himself seen were among the tribes in the interior, near to the lakes Taupu and Roturua. The New Zealand name for the disease is Ungerengare.

Captain Cook had recorded that the New Zealanders would eat almost anything, and preferred decomposing food.

NEVIS.—("Rep. Roy. Coll. Phys., 1867," p. 17.)

NEW ORLEANS.—(See ORLEANS, NEW.)

NEW SOUTH WALES.—("Rep. Roy. Coll. Phys., 1867," pp. 82, 223.)—Leprosy was not indigenous. Many lepers, Chinese and others, have immigrated, but the disease has, with few exceptions, never spread. Dr. Ashburton Thompson, the Medical Officer of Health, records his opinion that the disease is not contagious, but most careful precautions have always been taken. (See chapter xxxiv. in present work.)

NEPAL.—("Rep. Roy. Coll. Phys., 1867," pp. xxi., 191.)—There is no knowledge as to how many lepers there are in Nepal. Lewis and Cunningham say: "A country in which a very large proportion of lepers are found."

The fact that the most severe measures—drowning and burying alive for instance—have for long been in force in Nepal, and that the disease still abounds, is very strong against "stamping out." The measures towards that end have been far more vigorous than any ever thought of in Norway. They have caused the voluntary expatriation of those not destroyed, and yet the disease persists. (L. & C., p. 72.) One-fifth of the Almora Leper Asylum inmates are immigrants from Nepal.

The Kumaunese are the same race as the Nepalese, and formerly had the same customs as regards lepers. "When a person became a confirmed leper he somehow disappeared, and there were no questions asked." Yet the supply was perennial. (See KUMAUN.)

NERBUDDA.—(See KHANDARA.)

NIZAM'S TERRITORIES (Hyderabad.)—No trustworthy statistics. Secunderabad and Bolarum are the places where British troops are located. Total population, 11,537,040. In 1891 the proportion of lepers per 10,000 was 2·5.

NOWGONG (Assam).—Hunter says that leprosy is a prevailing disease. "Leprosy common." (Papers, p. 259.) Salt-fish is freely imported for the coolies on the tea plantations of Assam, and it is often in bad condition.

New Brunswick.—("Rep. Roy. Coll. Phys., 1867," p. 1; Extract, Book I., pp. 49, 148.)

Nolvera Islands (Dutch, off Borneo).—Leprosy *very* plentiful, and abundance of fish.

Nova Scotia.—(Extract—Bk. I., p. 148.)

North Western Provinces.—Population, 34,252,271. The four divisions—Eastern, Central, Western, and Sub-Montane—range pretty much together with ratio of 2·1; Western to 3·6; Sub-Montane, for the whole, 1872, 3·2; 1881, 4·0; 1891, 3·4. Thus it may be slightly increasing. (See "Rep. Roy. Coll. Phys., 1867," p. 148.)

Norway.—(Letter from Dr. Hausen, *Leprosy Journal*, ii., p. 63; letter from Dr. Kauim, *Leprosy Journal*, ii., p, 67; "Roy. Coll. Phys. Rep., 1867," p. 231.) In 1856, fifteen per 10,000; 1880, seven; 1890, five. The Commission wrote: "Complete segregation has never yet been possible. *Both in the Sandwich Isles and in Norway it has failed.*"

Dr. Abraham wrote: "To attribute the decline of leprosy in Norway to compulsory isolation is extremely erroneous." (Extract, Bk. I., p. 115.)

Dr. Hansen has recently written respecting the risk of contagion that no special precautions are observed when lepers travel, and that "the disease is not one of which it is needful to have any special fear." (See chapter xxvi. of present work.)

Oman (Arabia).—Anciently the home of the "Ichthyophagi." It has still a trade in dried fish for export.

Orissa.—Writing of the climate of Pooree in the "Calcutta Med. Phys. Trans.," vol. iv., Dr. Brander states: "Fish is to be had at all times, and in great variety and abundance during the colder months. The Chilka lake, about fifteen miles distant, furnishes all the year round an infinite supply of most delicate kinds of fish, including, in the proper season, oysters, crabs, prawns, etc." Chilka Lake is a shallow inland sea, forty-four miles long, in the Puri district. A report on the famine which occurred in this district in 1865 states that since the abolition of the salt manufacture the fishes of the Chilka lake constitute the only means of sustenance of the few inhabitants who still cling to its coasts and inlets. They dry these fishes in large quantities, and export them to the surrounding districts.

Orleans, New (Capital of Louisiana, U.S.A.).—As to the food, Dr. Henry W. Blanc writes: "Salt meat and fish, when they can be procured, are eaten by the poor all over the world. In the warm summers of New Orleans it is probable that much of the meat and fish eaten by the poorer classes is not as fresh as it should be" (p. 58).

Oude.—Population, 12,650,831. (See Papers, pp. 100, 101; see p. 322.) Divided into Northern and Southern, it has a ratio of 4 for the whole, and has experienced a very decided reduction from 7 since 1872: 1872, 6·9; 1881, 3·9; 1891, 4·1.

Dr. Rice, Inspector-General of Hospitals, expressed the opinion (Papers, p. 73) that there was no proof of increase in Oude.

Palestine.—(Extract—Bk. I., p. 143.) (See back, p. 322.)

Paraguay.—The little republic of Paraguay is placed in the middle of the southern part of South America, almost equidistant from the Atlantic and Pacific, and having no sea-coast of its own. It is a sort of Mesopotamia, being enclosed between arms of the La Plata river, much as is that district between the Tigris and Euphrates. They are the Paraguay and the Parana. The population of Paraguay is probably under 400,000. The religion is Roman Catholicism, but its rules are only lightly observed. Leprosy and goitre are, according to the "Encyclopædia Britannica," the only endemic diseases.

From a private source (medical) I am assured that there is not any large amount of leprosy, and that the disease assumes a mild type. There is no leper-house, and no attempt at segregation.

Paris.—Leloir, Hardy and Besnier, in 1886, estimated that there were no fewer than from 60 to 100 lepers resident in Paris, and M. Thibierge, in 1892, said that he did not think this number exaggerated. (See *Leprosy Journal*, iv., p. 64.) No special precautions are observed, and in no single instance has contagion been suspected.

Patagonia.—Reputed free from leprosy. "Rare or absent." ("Rep. Roy. Coll. Phys., 1867," p. 32.)

Patiala.—Nine lepers seen by the Commission and several cases of mistaken diagnosis, six Hindus, three Moslems. Two of the Hindus were Brahmins.

Patria.—In 1843. (Extract—Bk. I., p. 137.)

Pemba (Zanzibar).—Thirty-three lepers per 10,000. Two hundred in a population of 60,000. They eat imported dried fish, shark and a kind of cod, very freely. It is imported from Muscat, a thirty days' voyage, and is often in an exceedingly bad condition.

Penang.—"On we went between neatly-trimmed hedges of China-bamboo, past Chinese shops with quaint signs, and dried fish of curious shape and fearful odour, flopping in the breeze." ("Our Australian Cousins," by James Inglis, 1880.)

"An important leper-hospital is maintained on Pulo-Jarajah, a small but lofty island in the strait opposite the town" (Penang). ("Ency. Britannica.")

Persia.—("Rep. Roy. Coll. Phys., 1867," p. 71.) Consul-General Abbott reported to the College of Physicians from Tabreez that "he had no knowledge of the disease and could discover no one among the natives who had." (Paper 71.) Dr. Cornish, who had been long in practice in the country, states that he had had occasional opportunities of becoming acquainted with the disease. It is called jezân. Said to be more frequent in Zeryan, a sterile plain halfway between Tabreez and Teheran.

Never known amongst the better classes. Exists in elevated dry districts. "Twenty years ago there were no lepers to be seen on the road between Tabreez and Teheran." Now you cannot quit Tabreez without encountering them. The traffic on the road has much increased, and this may have brought them there to beg, but at the same time it may have supplied salt-fish.

Peru.—Rare. Dr. Lespre's statement. (Extract—Bk. II., 187; "Rep. Roy. Coll. Phys., 1867," p. 32.)

Peshawar.—Supposed to be almost free. Statistics gave for 1881, for the division, 296, or 2·2, and for the district 90, or 1·5. Many reputed cases were collected for the inspection of the Commission, but only in two was the diagnosis confirmed. The others were mostly syphilis.

Philippines.—(See Extract—Bk. III.) Dr. Amese: 360 in 10,000 in one village of 400. Much fish-eating. (See Sulu.)

Poona (Bombay).—Forty-five cases seen by the Commission. One Moslem and one Brahmin. (See page 20 of Report.)

Porto Rico.—One of the Spanish West Indian Islands; is a little larger than Jamaica, but its exports are double the value of those of the latter. It is extremely fertile and exports sugar, coffee, tobacco, and salt. Its population has increased from 319,000 in 1830 to 1,000,000 in 1904. Cotton, rice, maize, and a great variety of fruits are grown. It was visited by Columbus.

Dr. W. F. Smith, of the Board of Health, St. Juan, was good enough to report to me in 1904 as to the prevalence of leprosy. It was, he believed, about four per 10,000. Salt-cod is very largely used as food, but it is now of good quality. Formerly, when it was not good, it was, however, not suspected (Dr. Smith states) as a cause of leprosy. It will be observed that the island produces salt, and even exports it. Leprosy does not increase. Of the forty cases, twenty-five are in the hospital at St. Juan, and the others at their own homes. Although Dr. Smith avows himself not convinced of the fish-hypothesis, yet his facts seem to favour it, and thus to discredit contagion.

Portugal.—(Extract—Bk. I., pp. 6, 43.)

On the authority of Dr. Donnel we have it that all classes, rich and poor, among the Portuguese eat fish on Fridays and Saturdays throughout the year.

Prussia (Eastern).—(Extract—Bk. I., p. 7.)

Punjab Leper-Asylums. — (Punjab Administration Reports, 1900—1991.) "Leper-asylums are established at Tarn—Taran (Amritzar), Sabathu, Dakni Serai (Jullundar), Baba Lakhan (Sialkot), Ambala, Rawal Pindi, and Dharmsala. There were 518 lepers remaining at the close of the year 1899, and 227 were admitted during 1900, making a total of 745. Of these 90 died, and 125 left of their own accord, leaving at the end of the year 530." In the last report (1901—1902) it is stated that there were only 390 lepers in residence at the end of the year, and whereas there were 2·6 lepers per 10,000 in 1891, there were only 1·3 per 10,000 in 1901.

Purulia.—The Commission visited the asylum, which contained ninety-nine inmates: male sixty-one, female thirty-eight. I visited the asylum in 1903 and found it much enlarged, containing near 500. Only one was understood to deny having eaten fish.

Raipur.—(Papers, p. 218.) Leprosy very prevalent and believed to be increasing. 1872, three per 10,000; 1881, five per 10,000; or nine in males and four in females. This large increase may be due in part to more complete enumeration.

Rajputana.—Eastern, 1891, 0·7; Western, 1891, 2·3. 1·4 for the whole population of 12,126,655. No report for further back. ("Rep. Roy. Coll. Phys., 1867," p. 175.)

Rangoon.—(Papers, p. 236.) No proof but a general impression that the disease is on the increase.

Ratnagiri (Bombay).—It is on the coast, and the Tarli, or Sardine fishery, is an important industry. It has leper-hospitals (Hunter). Mr. William Ashdown wrote to me from Bombay and stated that the leper-house was built twenty-five years ago when he was in charge (Lewis and Cunningham, p. 23).

Rawal Pindi (between the Punjab and Kashmir).—There is a leper-house and a considerable population of Christians (3,000). Hunter does not mention any fish trade. (See Papers, pp. 160, 164.) The asylum can receive fifty, and the cost of each leper is estimated at fifty rupees (less than £5). The Commission saw forty-seven lepers and one not such. All but one were Moslems. The native states supply many, especially Puneb.

Rehtak.—(See Delhi.)

Rhodes.—Much salt-fish. ("Rep. Roy. Coll. Phys., 1867," p. 58.) Leprosy occurs only amongst the lower classes, seamen, sponge-divers, or shepherds, seldom more than one in a family affected, and no evidence of contagion or transmission. (Dr. Mazzinghi).

Rio de Janeiro.—(See Brazil.)

Robben Island.—(Extract—Bk. I., pp. 127, 133; Report of Dr. Ross, *Leprosy Journal*, No. 2, p. 77; "Rep. Roy. Coll.

Phys., 1867," pp. 49, 57.) Dr. Abercrombie, the resident, wrote in 1863: "For the last ten years the average number in the island has been from fifty to sixty." He believed that some were entertained at public expense in the eastern part of the colony.

Roumania.—(Extract—Bk. I., p. 47.)

Russia.—(Report by Dr. Petersen, *Leprosy Journal*, No. 2, p. 72; *British Medical Journal*, Jan. 21, 1899.) It is reported that leprosy is spreading to a marked extent in the provinces of Livonia and Courland, and that the number of lepers in Russia is at present 5,000. The editor of the *Bombay Medical Times* remarks: "But after all, even 5,000 lepers are but a drop in the ocean of 127 millions." (Extract—Bk. I., pp. 9, 119.) It occurs in many places on the shores of the Black and Caspian Seas and near the deltas of the great rivers which empty into them. With extreme rarity in the interior of Russia. It is now, but only of recent years, prevalent in Siberia. (See chapter xxxi. of present work.)

Sabathu (twenty-three miles south-west of Simla).—The asylum receives eighty-five inmates, most of them lepers. Commission saw forty-six lepers, five of whom said that they had not eaten fish or meat. Many lepers sent in from the native Hill States. (Papers, p. 136.)

Salonica.—("Rep. Roy. Coll. Phys., 1867," p. 68.) Principally vegetable diet and salt-fish.

Samarcand.—Mr. Biddulph reports having seen several cases. (See Trans-Himalayan districst.)

Sambalpur.—Believed to be increasing. (Papers, p. 220.)

Samoa.—It is said that there is no leprosy in the group.

Sandwich Isles.—(Extract—Bk. I., pp. 147, 149.)

Sardinia.—(Extract—Bk. I., p. 115.)

Scotland.—"All corrupt swine and salmond to be given to the leper folke." (Extract—Bk. I., p. 113.) (See quotation from the Rev. L. T. Debes in first number of *Leprosy Journal*, p. 76.)

Seychelles.—Report by Dr. Hood. (*Leprosy Journal*, No. 2, 1890, p. 89.)

SHANGHAI.—("Rep. Roy. Coll. Phys., 1867," p. 77.)

SHAHPUR (Punjab).—Disease stationary. (Papers, pp. 160, 164.) Mr. J. Wilson reports that bands of lepers from other districts regularly come on tour to beg and are paid by the headman to move on. (Papers, p. 165.)

SIALKOT (Punjab, on River Chenab, Baba Lakhan).—Average number of patients, sixty-five; cost of each, forty rupees. There were forty inmates when the Commission visited it. Thirty-two Moslems and eight Hindoos. Hunter mentions an asylum at Patharwali capable of receiving a hundred patients.

SIBERIA.—(Extract—Bk. I., p. 119.)

In connection with the extension of Russian civilization in Northern Asia, leprosy has made its appearance at many places where a century ago it was unknown. In some of these it now prevails to a very serious extent. In all instances its prevalence is coincident with large consumption of badly salted fish. (See Appendix, and pages 285 and 323 of present work.)

Of the Ostiac Tartars (Siberia), Kelly (vol. i., p. 152) records whilst the other wandering tribes may be properly called shepherds, the Ostiacs may be called a nation of fishermen, for fishing during the whole summer and part of the winter is their chief occupation. . . . In the summer they move their habitations to the places most adapted for fishing, but have settled habitations in winter, to which they annually return.

I am indebted to Mr. H. T. Wood, the secretary of the Society of Arts, for a quotation from Mr. H. De Windt's work, "Paris to New York by Land," which states, respecting the Siberian exiles at Czedric Kolymk: "They were living throughout the winter upon fish caught the preceding summer, unsalted, and therefore quite unfit for human consumption. Leprosy very prevalent."

SIBSAGAR DISTRICT (Upper Assam).—Rice is almost the only article grown for food, the rest being obtainable from jungles and streams. The use of flesh as an article of food is very rare. The prevailing diseases are fevers of a remittent and intermittent type, cutaneous disorders, leprosy, elephantiasis, and gôitre. (Hunter.)

Sicily and Lipari Islands.—(Some account of Profeta's Report, "Leprosy Pamphlets," VI., p. 69.) Profeta came to the conclusion that inheritance was the only possible explanation of the facts. He collected the particulars of 114 cases: eighty men and thirty-four women. In no instance was there any evidence of contagion, although twenty-two of the lepers had lived with their families for many years. The fish-hypothesis was rejected because the disease prevailed rather inland than immediately on the coast. It was even more prevalent amongst the well-to-do than the very poor, and certainly poverty had nothing to do with it.

In an excellent summary of information as regards leprosy, in the July number of the *Medical Chirurgical Review*, 1877, we read: "With its tendency to linger in the islands, it is not surprising that leprosy is still to be found in Sicily and some of the Lipari Islands."

Sierra Leone.—("Rep. Roy. Coll. Phys., 1867," pp. xi., 52.) "The ordinary diet is corn or vegetables, with fish."

Sikkim.—Leprosy almost unknown. (See "Hooker's Himalayan Journal," p. 92.)

Sinde and Baluchistan (including Kurrachee, Hyderabad, Shikapur, and on Upper Sinde frontier, Quetta).—Population, excluding Baluchistan, 2,871,774. Ratio of leprosy per 10,000, 1871, 1·3; 1881, 1·1; 1891, 0·7. In the Nara river there are profitable fisheries. (Hunter.)

The river fisheries of the Indus and its offshoots not only supply the province with fresh fish, but afford a considerable export trade in dried pæla, the hilsa of Bengal.

Singapore.—Dr. Galloway, writing of Singapore (prize essay, not published), confirms the impression that the Malays there do not suffer much from leprosy. In ten years he saw six Europeans; thirty Eurasians; many hundred Chinese; very few Malay.

Smyrna.—("Rep. Roy. Col. Phys., 1867," p. 60.)

South America.—(Extract—Book I., p. 151.)

Spain.—It declined early, as in Italy, and became restricted to its present centres as early as the beginning of the sixteenth century. It is still fairly prevalent. There is much importation of salt-cod from Norway and Newfoundland. (See a good history of it in Extract—Book I., pp. 43, 125.)

Dr. Hernando, of Granada, has written an elaborate account of leprosy as observed by him in the South of Spain. Granada has a sea-coast on the Mediterranean, and the population is, of course, Roman Catholic. Leprosy appears to be fairly prevalent, but not excessively so. Not being well acquainted with Spanish, I have not been able to read his book satisfactorily. It extends to more than 500 pages.

The author of "Don Quixote".was co-temporary with Shakespeare, and wrote at the end of the sixteenth century. Describing the arrival of his hero at an inn, Cervantes tells us: "As luck would have it that day was Friday, and there was nothing in all the inn but some rations of fish, which in Castile is called a badejo, and in Andalusia bacalhao, and in other parts curadilla, and in others again truchuela. They asked him if haply his worship could eat truchuela, as there was no other fish to give him." Pleased with the prospect of a dish of delicate troutlings the knight replied "that provided only there be plenty of them they might be equal to a trout."

The narrative proceeds: "They laid the table at the door of the inn in the open air, and the host brought the guest a portion of *badly-cured and worse cooked stock-fish,* and a loaf of bread as black and grimy as his arms."

The fate here fabled to have befallen Don Quixote has no doubt been a dire reality to many a Spanish wayfarer, unhelped by the Don's infirmity, which enabled him to accept badly-cured stockfish as young trout. The part of Spain to which this referred is the south, but probably at a distance of sixty or a hundred miles from the coast. It is a region in which leprosy still prevails. The fish most suspected is still called "bacalhao." It is salted cod.

STEPNEY.—A reported *de novo* case. (Extract, Book, I., p. 75.)

STRAITS SETTLEMENTS (Malay Peninsula).—("Rep. Roy. Coll. Phys. 1867," p. 198.)—In these regions the chief sufferers from leprosy are Chinese coolies. The original population has been supplanted by Chinese, who have brought leprosy with them. It was formerly, according to tradition, a rare disease, and it is reputed to be a Chinese malady. (See Cantlie's prize essay.)

St. Helena.—A paper by Dr. McRitchie, in "Trans. of Med. Soc. of Calcutta, 1836," states that "Elephantiasis and lepra attack people of colour" in St. Helena, and adds, "the diet of these people consists chiefly of rice and fish, and a good deal of salted meat."

St. Kitts.—("Rep. Roy. Col. Phys., 1867," p. 16.)

St. Lucia.—("Rep. Roy. Col. Phys., 1867," p. 22.)—"Diet mostly vegetable; salt-fish is the most general animal food they have."

St. Vincent.—("Rep. Roy. Col. Phys., 1867," p. 24.) Dr. Arnott: "I consider the ordinary diet of the population (consisting chiefly of salt-fish, vegetables, corn-meal, fresh-fish, with a very insufficient proportion of fresh meat and bread) to be unfavourable to the preservation of good health generally."

Sulu Archipelago (Philippines).—Dr. J. M. Amese, March, 1904, writes as follows in *North-West Medicine*:

"From all the sources of information accessible at this time, it is believed there are 350 lepers in the Sulu group, which, allowing these islands a population of 85,000, implies a ratio of four to 1,000. This proportion is lower than that found in the Hawaiian Islands, New Caledonia, British North Borneo, or Java, but is much greater than the percentage in India, where leprotics are segregated in suitable asylums.

"Both forms of the disease are recognized by the Moros under the general name 'Epul,' the anesthetic type being considered non-contagious and its victims allowed to live out their lives with the family, while the exudative or tuberculous form is looked upon as the most baneful disease that afflicts the race. Their views on its etiology are at once interesting and puerile, coloured as they are with the vein of superstition that pervades their entire folk-lore and daily life. They believe (1) That leprosy can originate, *de novo*, through sorcery or the enchantment of some enemy; (2) That it may follow continued and intimate association with one already stricken with the tuberculous form; (3) From a fish-diet, especially when restricted to one species known among the Moros as the 'Ty Yook.'

"The theory advanced by the distinguished leprologist, Jonathan Hutchinson, whose convictions concerning this factor in the etiology of the disease have recently been strengthened by further research in India, would find many earnest advocates among these primitive people. In the Island of Panducan, twenty-five miles north-west of Jolo, there are fifteen lepers in a population of about four hundred; these people subsisting almost exclusively upon sea food, preferring, always, to eat it dried and uncooked. While it is recognized that, until the chain of evidence is complete and the bacillus of Hansen demonstrated in the food itself, such observations as these can be of but subsidiary value to medical science, the fact is strongly borne in on one that here we may find the solution of the question."

SUMATRA.—Of Sumatra but little is known with precision. Leprosy is believed to be scattered over the whole island, but to affect chiefly Chinese immigrants. Sumatra possesses fine mountain lakes. Europeans are occasionally attacked and return to Holland as lepers.

SUNDERBUNDS.—Large quantities of fish are caught and sent to Calcutta.

SURINAM (Dutch Guiana).—(See Hirsch's Handbook, vol. II., p. 48. Dr. Rognat Landie reported on it. (See Pamphlets, vol. vi., Mericourt, p. 22.) It was reported that three Catholic clergymen in *Batavia had become lepers. (*Leprosy Journal*, ii., 153. See *Medical Times and Gazette*, October, 1880.)

SWEDEN.—Dr. Huss, in 1858, stated that leprosy was almost extinct, even in the northern provinces bordering on the Gulf of Bothnia, but added that it was only within the last forty years that it had disappeared from Bohuslan and other provinces in the South of Sweden. Its disappearance was said to coincide with a great decline in herring fishing.

SYLHET (a remote corner of Bengal, adjoining Assam).—The rivers abound in fish, and the drying of fish forms an important industry. There is excellent fishing in the streams from the northern hills. (Hunter.) Hunter does not mention leprosy. The vital statistics as yet are untrustworthy.

---

* This Batavia must not be confused with the capital of Java.

Syria.—("Rep. Roy. Col. Phys., 1867," pp. xi., 54, 56; Extract—Bk. I., p. 159.) In Jerusalem "it is only found among the native population, and is almost entirely confined to the Mohammedans." In the College report it is said to occur most frequently in the highlands and tablelands rather than on the coast. No mention of fish-food (p. 23). (See Jerusalem.)

Tanganyika.—(Extract—Bk. I., pp. 132, 130.) Mr. Cameron, in his book, "Across Africa," vol. ii., p. 90, gives a notice of a leprous district or village west of Lake Tanganyika.

Tanjore.—No asylum. Twenty patients seen by the Commission, but four of them were not lepers.

Mr. J. Ross, M.B., in the *Madras Monthly Journal of Medical Science*, 1871, gives a report of the various races and inhabitants of the Tanjore district (Madras Presidency). Of the Kororars and Woddars, he records that they are omnivorous, eating everything, from the carcasses of dead bullocks down to insects; they subsist chiefly, however, on roots and fish. Of other tribes, he records that they eat roots and fish.

Hunter says there is a constant flow of labourers from Tanjore to Ceylon, and that before rice was introduced into Ceylon, Tanjore supplied the island with food.

Tana Sea.—Lepers and fish. (See under Abyssinia.)

Tarn Taran Asylum (Punjab).—One of the most important leprosy centres in Northern India. The asylum is a short distance from the city. I visited it in 1903, and under the kind guidance of the Rev. J. G. Guildford obtained much valuable information. Mr. Frederick Mackenzie (then resident in Amritzar), had supplied me with statistics more than thirty years ago. (See "Leper Pamphlets," Vol. VI.; Papers, pp. 158, 184, 171, 172.)

Thirty-one out of 118, at the time of my visit, said they had never eaten fish. Some of the others, however, admitted that they had eaten fish "in plenty," thus proving that it was to be had. All stated that their relatives were accustomed to eat it.

n Tarn Taran there are hundreds of lepers living amongst other people in the city. They prefer this because they can beg. The Commission found in the asylum 146. (See Analysis, p. 26, as to those who had eaten fish.)

Hunter states that in 1880 "there were 352 lepers in the asylum, the largest in the Punjab, twelve miles south of Amritzar, and on the junction of the Beas and Sutlej rivers." Its tank has the reputation of giving health to any leper who can swim across it. It is said that Guru Arjun, the founder of the town, was himself a leper. Population, in equal proportions, Sikh, Hindu, and Moslem.

Tasmania.—("Rep. Roy. Coll. Phys., 1867," p. 224.) "A death from leprosy has never been recorded since the registration was initiated." Dr. Ashburton Thompson in 1900 confirms this statement.

Terra del Fuego.—(Extract—Bk. I., pp. 130, 132.)

Tobago.—(" Roy. Coll. Phys. Rep., 1867," p. 36.)

Tonquin.—(Extract—Bk. I., p. 136.)

Tortola.—("Rep. Roy. Coll. Phys., 1867," p. 15.) Leprosy is rare in the Virgin Islands.

Tracadie (New Brunswick).—(Extract—Bk. I., p. 148. See page 235 of present work.)

Trans-Himalayan Districts.—Schuyler states that in the trans-Himalayan districts and the whole of the central area leprosy is met with. He adds that lepers are obliged to live by themselves, but he saw numbers of them by the gate of Samarkand.

Trichinopoli.—There is a leper hospital to take in sixteen. The Commission saw there nineteen lepers and three who were not. Nine were Hindoos.

Trinidad.—(" Rep. Roy. Coll. Phys., 1867," pp. 38, 207; Extract—Bk. I., pp. 67, 153.)—" Deficient and innutritious food. The poor live much on tainted fish and vegetables, such as plantains, yams, etc." " The almost entire use of salted meat and fish, and the abuse of spirituous liquors, as is the case in country districts, where fresh meat is seldom to be found."

TURKEY.—("Rep. Roy. Coll. Phys., 1867," p. 70.) "Chiefly, but not exclusively, among the poor" (Constantinople). "Very common amongst the native population of the district."

Zambuco estimated the number of lepers in Turkey at 4,000. He writes further: "J'ai dû entrer dans tous ces détails pour prouver que l'issolement des lépreux de Scutari est absolument illusoire et que la population de la capitale, de Scutari surtout, se trouve en communication quotidienne, permanente, avec les lépreux, d'une manière directe et indirecte. Hé bien! Il n'y a point de lépreux dans la ville de Scutari. De mémoire de l'homme il n'en a point eu."

UMBALLA (Punjab).—The Commission saw thirty-two lepers, twenty-nine Hindus (all, excepting one Brahmin, of low caste), three Moslems and Rajputs. Nearly half "owned to never eating fish."

UNITED STATES.—(Extract—Bk. I., pp. 15, 148, 149, for Norwegian lepers in U.S.A.)

UOMI, LAKE (Northern Persia).—Mr. R. T. Günther describes the neighbourhood of this lake in a paper in the "Geographical Transactions," November, 1899. He states that there are fresh-water springs "named after St. George, and of much repute in cases of leprosy." It is 4,000 feet above sea-level.

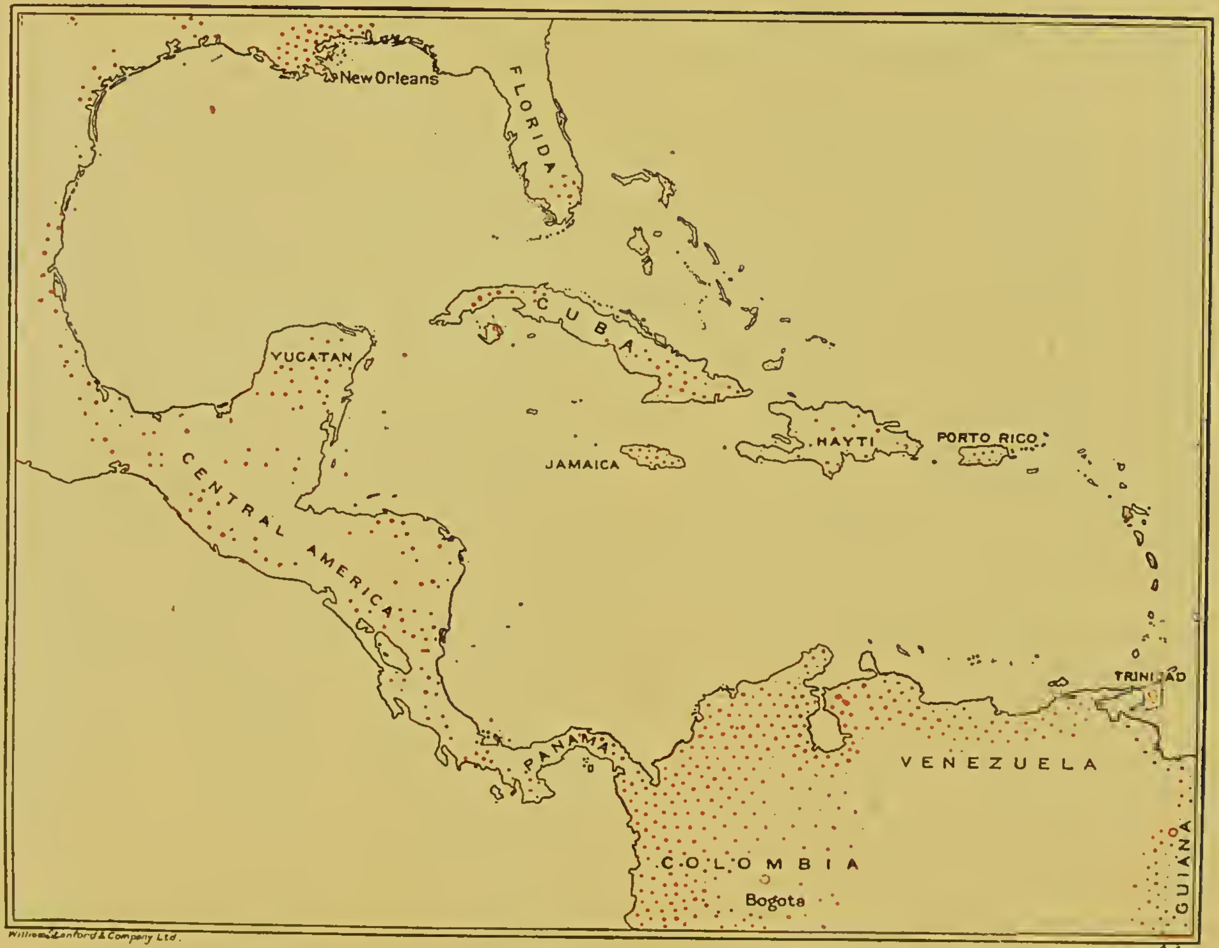
VENEZUELA.—(Extract—Bk. I., p. 18.)

VICTORIA.—("Rep. Roy. Coll. Phys., 1867," pp. 89, 224.)—"Solely amongst the Chinese." (See also Ashburton Thompson's prize essay, and page 268 of present work.)

VIZAGAPATAN (Madras).—Leprosy is said to be common near the coast (Hunter). There is a population in the district of 3,000 Christians, of whom only about 500 are Roman Catholics.

WAZARISTAN.—Mr. W. F. Plant, of the 3rd Punjab Cavalry, told me that he had been several years in Wazaristan, (N. W. F. India) at Wana. There was plenty of fish in the rivers, very good fish, but the natives did not catch it, and as a rule would not eat it. They were Mahomedans. He had never heard of leprosy in the district.

PLATE XVI.



Map of the West Indies, Etc., showing the Distribution of Leprosy at the Present Time. (o denotes a leper-home.)

[*To face page* 407.

West Indies.—("Rep. Roy. Coll. Phys., 1867," p. 18; Extract—Bk. I., p. 153.)—The reporters from these islands are almost unanimous in reporting equal distribution in the two sexes, and frequent affection of the well-to-do and cleanly. It is clear that the article of food which produces it must be one which is attractive to all classes, and to both sexes. All report the large consumption of salt-fish. Jews suffer much, especially in Jamaica. Over and over again it is said that the "diet consists chiefly of salt-fish and vegetables." (See back, p. 321.)

Zambesi.—(See Barotse Land.)

Zealand, New. (See New Zealand.)—("Rep. Roy. Coll. Phys., 1867," pp. xv., 223.)

I am indebted to my friend General Robley, who has from time to time supplied me with extracts, and for a copy of the 37th volume of the "Transactions of the New Zealand Institute," just published. An interesting résumé of the facts as to Leprosy in New Zealand, and the traditions current respecting it, is there given by Dr. W. H. Goldie. His chief authority is Dr. Thompson, to whose statements he does not add much. He writes: "Leprosy is found in nearly all the groups of islands of Polynesia. He is under a belief, wholly without foundation, that the disease has a natural tendency to spread for a time and then to decline. He says that the disease is said to have occurred in all parts of New Zealand, but chiefly in the North Island in the Rotorua and Taupo districts. It has several native names. "There can be little doubt that it has been known to the Maories for centuries." "A singular belief," writes Elsdon Best, "exists among the old natives, that the ngerengere disease (leprosy) is caused by the fish of the sea and the land birds." No fish is allowed to those under treatment for it. There are still a few isolated cases, one in particular is mentioned in the north of the South Island.

INDEX.

Abbott, Consul-General, 395
Abercrombie, Dr. J. M., 402
Aborigines, isolation of, 359
Abraham, Dr., 48, 393
Abstinence from fish, 266, 267
Abyssinia, 370, 384
Acworth, Mr., 340
Adrampet, 371
Afghanistan, 372
Agents influencing local prevalence, 200
Agna de Dios, 219, 225, 277
Agra, 157
Agulhas, Cape, 183
Albricht, Dr. M., 328
Alexandra Country, 150
Algoa Bay, 183
Allahabad, 390
Allen, Dr. Frank van, 81
Alligator River, 261
Almora, 81, 371, 385, 392
Amazon, Fish curing on the, 361
Ambala, 396
Ambelama, 378
America, South, 13, 394, 400; North, 238, 390, 394
Amese, Dr. J. M., 402
Amritzar, 157, 396, 404
Amur, 246
Analogies with certain other maladies, 362
Ancient times, Leprosy in, 4
Andaman Islands, 371; Food of the natives, 354
Anderson, Dr., quoted, 15, 114
Andrews, Mr. William, 94
Angami-Laga Hills, 331
Anguilla, 331
Antigua, 116
Antipathy to fish, 158
Antiquity of leper houses, 289
Arabia, 393
Aracan, 372
Aral Sea, 242
Arango, Dr., 80
Arcot, 345, 346, 372, 378
Argentine Republic, 221, 372
Armagh, 293
Arning, Dr., 226
Arnott, Dr., quoted, 15, 402
Arputhasanie, 378
Arteaga (N. Mexico), 308, 389
Ashdown, Mr. William, 397
Ashmead, Dr. Albert, 218, 225, 335, 383
Asonsol, 196
Assam, 344, 354, 372, 374, 392, 399
Astrachan, 239
Auckland, 391
Augustin, Dr., quoted, 14
Australia, 171, 231, 259, 358; Chinese in, 264; Fishing industry in, 260; Malays in, 261; West, 262
Ava, 323
Azov, Sea, 239

Baba Lakhan, 396, 399
"Bacalhao," 401
Bacillus-leprae, vii., 29, 195, 314, 352, 403; not found in fish, 120
Backhouse, Mr. James, 138
Bacon, Mr. E. V., 246
Badakshan, 372
Bahamas, 14, 373
Bahia, 306
Bailey, Mr. Wellesley C., 118
Bain, Mr., 315
Baker with leprosy at Lahore, 195
Bakewell, Dr., 391
Balasor, 119, 122, 189, 373
Ballarat (Victoria), 263, 267
Baltic, 63; Provinces, x., 243
Bancoorah, 343, 345
Banda, 171, 343

Barbadoes, 14, 116, 373
Barotze-Land, 373, 407
Barrow, Mr., 188, 328
Basutoland, 137, 142, 373
Batavia, 384; (Dutch Guiana), 403
Batchelor, Dr., 318
Bêche-de-Mer, 264
Bechuanaland, 182
Beechworth (Victoria), 267
Beerbhoom, 343, 345
Beer drinking, 314
Behar, 122, 344, 374, 382
Beloochistan, 189, 198, 335, 375
Benares, 100, 374
Bendigo (Victoria), 267
Bengal, 15, 122, 189, 196, 342, 344, 374, 403
Bergen, vii., x., 64, 167, 201, 203, 286, 374
Bhuttacharjee, Asst.-Surgeon Chunder, 331
Bible, 108
Biddulph, Mr., 398
Bidenkap, Dr., vii., 73
Bilaspur, 377
Biliotti, Consul, quoted, 257
Billingsgate Market, 162
Bird, Miss, quoted, 233
Birdwan, 343, 345
Black, Dr., His Objections to the Fish Hypothesis, 364, 365
Black Sea, 239, 398
Blanc, Dr., quoted, 55, 112, 236, 370, 394
Bloemfontein, 132
Bloomfield, Colonel, quoted, 390
Boate, Dr. (1652), quoted, 293
Bodmin, 300
Boeck, Dr., vii., 81, 201, 330
Bogota, 218, 378
Bokhara, 374
Bolivia, 375
"Bombay Duck," 341, 352
Bombay Presidency, 103, 107, 199, 354, 362, 375, 396, 397; Sexes compared, 116; Statistics, 337
Borneo, 393
Börthen, Dr., 201, 36
Boston (Natal), 311
Bowerbank, Dr., quoted, 13, 107, 172
Boyaca, 220
Brahmins, 100; Kanara, 347
Brander, Dr., quoted, 393
Brazil, 305, 375, 397
Bream, 363
Bredasdorp, 183
Briant, Mr. Arthur, 91
British Medical Journal, quoted, 254
British Isles, 285
Brittany, 235
Britwell, Dr., quoted, 157
"Brockens," 175
Brunelli, Dr., 254
Buckland (Victoria), 267
Buddha, 107
Buffalo Bay, 184
Bulwer, Sir Henry, 379
Burmah, 190, 323, 335, 375
Burman Race and Fish Diet, 353
Burton, 290

Cachar, 344
Cadge, Mr., 298
Cadiz, 69
Caffraria, 147, 315
Caiffa, 322
Cairo, 321, 376
Calcutta, 100, 107, 157, 194, 198, 324, 343; Emigrants, 349
California, 230, 376
Cala, 132, 312, 316
Caledon, 133, 174
Calicut (Bombay), 376
Calimnos, 360
Cameron, Mr., 404
Campana, Dr., 361
Canada, 235, 277, 376
Candia, 253
Canea, 253, 257
Cannheim, Dr., 254
Canterbury, 289
Cantlie, Mr., xii., 48, 155, 210, 230, 328
Canton, 211, 376
Cape Breton, 376
Cape Colony, viii., 41, 127, 167, 179, 261
Cape Town, Fish Factories, ix.; Italian Fisheries at, 179; Population of, 134
Captain Cook, 227
Careless statements, 163
Carleton, Dr., 345
Carpentaria, Gulf of, 261
Carp Fish, 303
Carribee Islands, 17
Carter, Dr. Vandyke, 329, 386
Carthagena, 218
Caseama Tribes, 376

Cashmere, 103, 110
Caspian Sea, 239, 376, 398
Cassidy, Dr., 316
Cassilis, Dr., 142
Castlemaine (Victoria), 267, 268
Causation of Leprosy, v., 271
Cauvery River, 199
Cawnpore, 376
Census, Bombay Presidency, 338
Central India, 376
Ceylon, 15, 112, 194, 276, 350, 379
Chaltis Garb, 377
Chamba, 345
Chatham, 289
Chaulmoogra Oil, 279
Chefoo, 212
Chekiang, 215
Chiansu, 215
Chicago, 238
Chihli (Pekin), 212
Chilka Lake (Orissa), 393
China, xi., xv., 15, 49, 165, 170, 210, 261, 335, 358, 377; Favourite Foods in, 356; North unfavourable for Fishing, 358, Salt Tax in, 187, 327, 358
Chinamen, Disseminators of Leprosy, 210; In Australia, 264; Opinions as to Contagion, 359
Chipman, Dr., quoted, 14
Chittagong, 343, 354, 377
Chosky, Dr., 337, 341
Chota Nagpur, 196, 344, 345, 390
Christiania, 66, 203
Christians, 103
Christie, Dr., 213
Chronological History of Herring Fishery, 332—335
Churra District, 377
Clanwilliam, 379
Cleveland, Dr., 388
Cocanada (India), 190
Cochin, 212, 377
Cod, 303
Coimbatorie, 199
Colchester, 299
College of Physicians, 329
Colombia (United States of), 111, 162, 218, 366, 378
Colombo, 157, 194, 350
Columb, Major, 126
Comorin, Cape, 352
Commensal communication, ix., 132, 156, 193, 195
Conclusions arrived at, xviii., xix.
Conger, 303
Constantinople, 378, 406
Consumption, 272
Contagion, Notes relating to, 70, 329; Opinions as to (Norway), 330
Contratacion, 219
Cookson, Dr., 297
Coorg, 199
Copenhagen, 283
Corfu, 383
Cornish, Dr., 395
Cornwall, 60, 96, 298, 336
Courland, 398
Cox, Mr. Arthur F., 345
Cradock, 184
Crane, Dr., 173
Craistor, Dr., 132, 312, 318
Creighton, Dr., 289, 301, 302
Crete, xv., 64, 253, 254, 286, 309, 321
Crimea, 239, 378
Crusaders, 5, 96, 281, 288
Cuba, 379
Cubar River, 239
Cuddalore, 378
Cunningham, Dr., 81, 343
Cure, 270; Attributed to Port Wine, 278; Results in London, 279
Curing of Fish, instructions, 184
"Curiosities of the Church," quoted, 94
Cuttack, 16
Cyprus, 379
Czedric Kolymk, 399

Dacota, 379
Daily Chronicle, Mr. Hawes's Letter, 246
Dakni Sarai (Jullundar), 396
Damara District, 379
Damascus, 80, 322, 380
Damberger, 145
Damien, Father, 76, 226
Danielssen, Dr., vii., 73, 81, 201, 275, 330
Darjeeling, 126, 194, 196, 380
Date, Earliest in England, 291
Daumaun, 189
Davis, Mr. J. F., 214, 327, 356
Day, Dr. Francis, 161, 189, 351—2
De Leproso Amovendo, 297, 301
De novo cases, 51; Opinions as to, 330 226
Deccan, 339
Decline in Europe, 285
Definition, 21
Dehra Doon, 343, 345
Dejarat, 380

Delhi, 380
Demerara, 380
Denial of Fish-eating, 155
Denmark, 66, 203, 285; John, King of (1508), 283
Dermatitis, 46
Deventer, Dr. J. van, quoted, 328
Dharmsala, 396
Diagnosis, 84
Dickson, Dr., quoted, 15
Diet in Leper Houses, 273
Diminution in India, 351
Disappearance of the Disease, 167; Spontaneous, 244
Disproportion in the Two Sexes, 110
Diu, 189
Dominica, 380
Donnell, Dr., quoted, 396
Donnet, Dr., quoted, 68
"Don Quixote," 401
Don River, 67, 239; Delta of, 242
Doolittle, quoted, 75, 216
Dorpat, 244
Drakensberg, Mts., 147, 277
Driver's Drift (Queenstown), 318
Duhring, Dr., quoted, 54, 56, 330
Durant, Dr., quoted, 16
Durham, 302
Dutch, 130

East London, 132
Egypt, 63, 67, 91, 165, 216, 291, 321
Ehlers, Dr. 254, 287
Elder, Rev. George, 327
Elephantiasis, 305, 324, 402
Ellis, Rev. William, 227
Emigrants, Indian, 349
Emjanyana Asylum, 314, 315, 321
Engcobo, 313
Engel, Dr., 321
England, Distribution in, 291; Early Records of Leprosy in, 289, 291; Lepers at present in, 6, 53
Essex, 299
Europe, decline in, 285
Evans, Dr., 292
Eveleen Silver Mines, 261
Exportation of Salt Fish, 144, 179, 246
Eye, Leprous Tubercle of, 362

Facts concerning Leprosy summarised, xvi.
False Bay, 182
Faröe Isles, 13, 63, 201, 206, 281, 380
Farquhar, Dr., 81
Fast days, Influence of, xv., 93; In Colombia, 366
Fatal Cases, 278
Fenn, Dr., 308
Fergusson, Dr., 378
Fiji, 231, 336, 380; Immigrants 349
Finch, Dr. 216
Finland, Spontaneous Disappearance of Leprosy from, 244
Finmarken, 204
Finn, Mr., 322
Fish, 324, 326; Abstinence from, of Primary Importance, 276, 277; Continued Use of, 273; Condition at Johannesberg, 178; Diet in Leper Houses, 273; Eaten Raw in Hawaii, 337; Exportation of, 144, 179, 246; Kinds of, "Bombay Duck," 352, "Brockens," 175, "Maldive," 352, "Ngapee," 335, 353, "Sackfish," 174, 182, 252, "Snook," 175, "Stock-fish," 303; Natural History of the Herring, 332; "Ngapee" in Burmah, 335, 353; Popular estimation of, 92; Preference for Stale, 332; Price of, 174, 178; Supplied to London, 362
Fish Curing, in Cape Colony, ix., 178, 184; Instructions in, 184; on the Amazon, 361
Fish eating; Burmah, 353; Colombia, 366; Denial of, 155; Extracts relating to, 331, 332; England, 303; India, 351; Punjaub, 125
Fish Hypothesis Stated, 44, 194; Applications of the, xviii.; Indian Objections to, 118
Fish River, 183
Fishing Industry in Australia, 260, 263
Fluke Disease in Sheep, 363
Fokien, 211
Food, 169, 356
Ford, Mr., quoted, 16
Formosa, 381
Fox, Dr. G. H., 169
France, 285, 381
Francis, Surgeon-General, 330
Free State, 182
"Friends' Examiner," 1, 388
Fuhchow, 217
Funchal, 59

Galloway, Dr., 400
Ganges, 100, 194
"Geelbeck," 175
Gehazi, 109, 171
Germany, 285
Ghurwal, 171
Gilchrist, Dr., 175, 178
Glanville (14th century), 23
Glen Grey, 316
Goa, 189
Gold Coast, 381
Goldschmidt, Dr., 387
Göteburg, 56
Gould, Mr. William, letter quoted, 359
Granada, 401
Greece, 381
Greek Church, 43
Gregory VII. (Hildebrand), 96
Gregory, Dr., 113, 127
Grenada, 17, 381
Griqualand, East, 137, 143
Grünfeld, Dr., 242
Guiana, British, 17, 168, 381; Dutch 381, 403
Gujerat, 199
Gulf of Mexico, 236
Gundulph, Bishop, 290
Günther, Mr. R. T., 406
Gya, 382

Hamburg, 277
Hammerfest, 203
Hammond, Mr. Walter J., 224
Hangchow, 358
Hankow, 216
Hansen, Dr., vii., x., 29, 72, 172, 201, 362, 393
Hare, Mr. E. H., 323
Haunts of Leprosy, 8
Hausaland, 323
Havana, 80, 112, 382
Hawaii, 173, 230, 337, 382
Hawes, Mr. C. N., 245, 323
Hawtrey-Benson's case, 77
Heber, Bishop, quoted, 99, 340
Hebra, Dr., 201
Hebrides, 60, 96, 332
Heidenstan, Dr., 379
Hellat, Dr., 243
Hemel-en-Aarde, 138, 141
Henderson, Dr., quoted, 15, 215, 382
Hermanus-petrus-fontein, 174, 182
Hernando, Dr., 401
Herpes zoster, 87
Herrings, 303; Natural History of, 332; Fisheries, 333—334
Heutzner's Itinerary (1598), 300
Hicks, Mr. Edward H., 219, 225
Hildebrand, 59, 96
Hillebrand, Dr., 228
Hillis, Dr., 381
Himalayas, 194
Hindoos, 99, 102
Hirsch, Dr., quoted, 254, 330
Hissar, 374, 380, 382
Hjort, Dr., quoted, 12, 13, 204
Hodge, Mr., 216
Hoegh, Dr., 204
Holland, 403
Holland, Dr., quoted, 11
Honduras, 382
Hong-Kong, 15, 165, 382
Honolulu, 76, 226, 232, 263
Hoogly, 100
Hooker, Dr., quoted, 197, 360
Horsham (Victoria), 267
Hoshungabad, 382
Hottentots, 133, 139, 248, 313
Hout Bay, 134
Howick, 309
Hunter, Dr., quoted, 16
Hunter, Sir William, 196
Hupek, 216
Husapti, 291
Hutcheson, Surgeon-Major (Kumaun statistics), 385
Hyde, Dr. T. Nevins, 238
Hyderabad, 354, 382, 392

Iceland, 11, 42, 64, 67, 201, 206, 281, 335, 382
"Ichthyophagi," 393
Ilford, 299
Immunity, in United States, 7; Amongst Sphakiots, 253
Impey, Dr. 113, 127, 141, 182, 274
Imray, Dr., quoted, 380
Incubation periods, 200
Incurability of Leprosy, 271
India, 15, 18, 276, 324, 331, 335, 343, 359, 376, 382, 390, 392—395; Decrease of Leprosy, 344, 351; Emigrants, 349; Census of Central Provinces, 376, 377; Increase of Leprosy, 344; Native Christians, 345; Notes from My Tour, 192; Ratio of Leprosy, 198; Salt Tax in,

187, 191; Statistics, 337, 382; Supply of Fish in Local Markets, 355
Indore, 382
Indus, 199
Inferences from the Prevalence of Leprosy, 31
Inheritance, 356
Inoculation, Failure of Experiments, 361
Instructions for Curing Salt Fish, 184
Ionian Islands, 383
Ireland, 62, 77, 96, 285, 292, 336; Earliest Leper Hospital in, 293; Catholics in, 224; Potato Introduced, 293
Irrawady, 324
Isolation, Ineffectual in the Middle Ages, 280; and Aborigines, 359
Israelites, 91
Italian Fishermen at Cape Town, 179
Italy, 283, 285

Jackson, Dr., quoted, 15
Jacobi, Professor, 288
Jaffa, 322
Jains, 102, 338, 347, 354, 360, 386
Jamaica, 13, 172, 383, 407
Jamieson, Dr. R. A., 215
Jamsetjee Jejeebhoy Hospital, 375
Japan, 107, 170, 211, 326, 335, 383; Exportation of fish to, 246
Java, 328, 384
Jaxartes River, 242
Jerusalem, 322, 384, 404
Jessop, Rev. Dr., 298
Jesuits, 308, 347
Jews, 92, 325, 407; of Jamaica, 170
Jhang, 384
Johannesburg, 132, 178, 182, 249
Johnson, Dr., 391
Johnston, Sir Harry, 164
Jolo, 403
Jubbulpore, 384
Jullunder District, 345, 384, 396

Kaffir tribes, viii., 42, 78, 135, 277, 311; deny eating fish, 158, 251; comparative exemption of, 249
Kaligaun, 198
Kalipance, 197
Kalk Bay, 134, 182
Kalmucks, 242
Kanaka, 173
Kanara, 346, 354
Kangra, 384
Karatchye, 239
Karpurthalla, 384
Kashmir, 196, 384, 397
Kassala, 384
Kathiawar, 199, 362
Khalapur, 384
Khandara, 392
Khandiva, 384
Khurson, 239
Kimberley, 131, 182
King, Captain, 230
King William's Town, 135
Kirk, Surgeon, 370
Knysna River (Cape Colony), 184
Koch, Professor, 280
Konkan, 198, 338, 341, 386
Kozlowsky, Dr., 240
Krishna, 100
Kumaun, 171, 343, 356, 362, 385
Kwantung, 211

Labour and Salt Fish, 132
Labuan, 116
Laccadives, 386
Lady Frere, 316
Laga Hills, 331
Lahore, 194, 195, 386
Lambert's Bay, 179
Lampreys, 303
Lanfranc, 290
Lassar, Dr., 242
Lazarus, 313, 318
Lee, Colonel, 81, 343
Léloir, Dr., 201, 361
Leper hospitals first built, 292
Leper houses, 273, 281; diet in, 273; in Middle Ages, 274, 288; punishment in, 283; management of, 283, 294, 295; antiquity of, 289
Lepra arabum, 324
"Leprosy stones," 231
Letheby, Dr., 162
Leucoderma, 109, 281
Levitical Law, 272
Lewia, Dr., 375
Lewis, Dr., 81, 343
Lincoln, 290
Ling, 303
Lingaluts, 386
Lipari Isles, 399
Lirland District (Baltic Provinces), 243
Lisboa, Mr., 375

Lisbon, 386
Lisle, 283
Listoa, Mr., 107
Liveing, Dr., quoted, 12, 13, 215
Livingstone, Dr., 71, 138
Livonia, 398
London, 74, 250, 277, 291, 296, 362; no precautions taken in, 366
London Hospital, vi., 164
Looft, Dr., 201, 362
Louisiana, 235, 394
Lucknow, 386
Ludhiana, 386
Lugard, Sir F., 140
Lui-fu, Szechuen, 216
Lunggaard's Hospital, 204, 274
Lupus erythematosus, 46, 281
Lyme Regis, 61

Madagascar, 49, 388
Madras, 81, 107, 157, 194, 343, 345, 348, 353, 354, 389; Hospital, 195, 198
Madrid, 80
Madura, 58, 81, 328, 386, 387, 388
Magdalena, 225, 366
"Maipaki," 228
Makern, Dr., 322
Malabar, 198, 348, 353, 388, 389
Malacca, 116
Malay Peninsula, 401
Malays, 261; as slaves, 144; in the Transvaal, 248
"Maldive Fish," 352
Malmesbury (Cape Colony), 88, 133, 173, 174, 176, 181
Malta, 388
Malwa (Central India), 302
Manchuria, 213
Mangalore (Madras), 346
Manrique, Dr. Julio, 366
Mantell, Dr., quoted, 16
Maoris, 39, 58
Mapapeta, 150
Maracaybo Lake, 366
Maranhao (Brazil), 306
Marathi, 347
Marco Polo, 328
Maritzburg, 152, 310
Mashonaland, 182
Matunga Asylum, 102, 337, 340
Mauritius, 16, 116, 179; immigrants, 349
McCrea, Dr., 265, 268
Mc'Intyre, Dr., quoted, 17
McKinney, Mr., 220
McLachan, Consul, quoted, 328
McRitchie, 402
"Medical Standard" of Chicago, quoted, 238
Mediterranean, 389, 404
Meerut, 389
Melbourne (Victoria), 267
Memel, 80, 389
Mergin, 352
Metelin, 360
Mexico, 308, 389
Mezo, 336
Miaco (Japan), 383
Middle Ages, 5, 43, 274, 280, 288; social condition in, 280; segregation in, 282
Middlesex, 212
Migration of Norwegians, 74, 277
Milk, 33
Milroy, Dr. Gavin, 329
Minicoy, 67, 110, 198, 356
Minnesota, 390
Mississipi, 236
Mitchell, Dr. John M., quoted, 332
Mitchell, Mr. Stephen, quoted, 336
Molde, 64
Molokai, 226, 228, 390
Moloney, Captain, quoted, 381
Monserrat, 390
Montagu, 183
Mooltan, 390
Morphæa, 87
Mortality, 273; on Robben Island, 274
Moslems and Catholics contrasted, 99
Moslem women, 112
Mosquitoes, 356
Mossul Bay, 179, 183
Mount Athos, 359
Mount Frere, 143
Motopai, 230
Mouritz, Dr., 230
Münch, Dr., 239
Muscat, 395
Mussoorie, 343
Mussulmans, 102
Myaveram, 353
Mysore, 390

Naaman, the Syrian, 108
Nablus, 322
Naevsted, 284
Nagpore, 196, 344, 345, 390
Naini, 390
Namaqualand, 182
Naples, 98

Narsingpur, 390
Natal, vii., 52, 78, 147, 165, 182, 309; Immigrants, 349; Importation of Fish, 181
Native Territories (South Africa), 113, 312
Nature of Leprosy, 3
Nayar Caste, 347
Nazareth, 322
Neisser, Dr., 201
Nepaul, 392
Nerbudda, 382, 390, 392
Neve, Dr., 113
Nevis (West Indies), 14, 392
New Brunswick, 13, 67, 114, 235, 393
New Granada, 378
New Orleans, 112, 236, 392
New South Wales, 229, 262
New Zealand, 39, 58, 231, 391, 407
Newfoundland, 68; Salt Fish exported from, 307
Newman, Dr. George, 289, 300
Ngamatsari, 143
"Ngapee," 335, 353
Nicobar Island, 371
Nicodar, 120, 158
Nikolaivesk, 246, 323
Nimar, 16
Nismes, 283
Nizam's Territories, 382, 392
Nolvera Island, 393
Nova Scotia, 393
North America, 235, 277
Northampton, 289, 290
North-Western Provinces, 344, 354, 393
Norway, vii., 42, 49, 56, 64, 66, 115, 167, 201, 281, 343, 358, 393; Exceptional Severity in, 275, 362; privation of women in, 204; Segregation, 207
Norwegians, Migration of, 74; Notorious Eaters of Decomposing Fish, xi.
Norwich, 291, 298
Nottingham, 291
Nowgong (Assam), 392
Nyassaland, 165

Objections to Fish Hypothesis, 118
Oesel Island, 243
Oil, Chaulmoogra, 279
Okhotsk, Sea of, 245, 323
Oldekop, Dr., 240
Olwade, Dr., 80
Oman (Arabia), 393
Orange River Colony, 137
Orissa, 122, 343, 353, 354, 393
Orleans, New, 236, 392, 394
Ostiak Tartars, 399
Oude, 354, 394
Owen, Mrs., quoted, 234
Oxford, 302
Oxus River, 242
Ozzard, Dr., 381

Paarl, 133, 182
Palestine, 63, 322, 394
Palgrave, quoted, 13
Panama, Isthmus of, 218, 366
Panducan Island, 403
Pantoppidan, Professor Eric, 271, 288
Paraguay, 394
Pará, 306
Park, Dr., 318
Paris, 277, 282, 394; No Precautions taken, 366
Parra, Ricardo, 218
Patagonia, 394
Patiala, 395
Patna, 16
Pehchihli, 215
Pekin, 210, 356; Immunity from Leprosy, 357
Peloponnesus, 360
Pemba (Zanzibar), 395
Penang, 395
Persia, 366, 395, 406
Peshawar, 395
Petersen, Dr. Oscar, x., 243, 398
Phenomena, 21
Philippines, 396
Piankhi, King (750 B.C.), 91
Pig's flesh, 34
Pike, 303
Planc, Dr., 81, 171
Plant, Mr. W. F., 406
Plettenberg Bay, 183
Polyclinic, 279; Journal, 238
Pondoland, 145, 147, 315
Poona, 396
Pooree, 16, 393
Port Elizabeth, 132
Porto Rico, 396
Porpoises, 303
Portugal, 49, 65, 68, 98, 111, 167, 285, 321, 396
Port Wine Cure, 278
Possibilities, 35
Potato, Introduction of, 293
Poverty not a Cause of Leprosy, 171
Prahof, Dr., 240

Pretoria, x., 132, 251
Prevalence, 38; Agencies Influencing Local, 200; Disproportionate in the Two Sexes, 110; Excessive in Bengal, 342; In India, 343; Relative, 343; Sparing in Cape Colony, 129
Privation of Norwegian Women, 204
Probabilities as to Nature of Leprosy, 29
Processes, not Stationary, 25
Profeta, Dr., 356
Prussia, Eastern, 396
Psoriasis, 129, 281
Ptah-hoteb (3366 B.C.), 91
Ptomaine Poisoning, 362
Punishment in Leper Houses, 283
Punjaub, 106, 125, 194, 343, 354, 384, 396, 399
Purulia, 120, 157, 196, 397

Quakers of Hinduism, 104
Queensland, 262
Queenstown (C. Colony), 318
Quiescence of Leprosy, 272

Rabagliati, Rev. Father, 221
Raipur, 397
Rajputana, 199, 397
Rajputs, 100
Rangoon, 324, 397
Ransom, Dr., quoted, 48
Rat, Dr. Numa, 331
Ratnagari, 338, 397
Rawalpindi, 396, 397
Recoveries from Leprosy, 270, 277
Reed, Dr., quoted, 17
Reformation, The, 93, 285, 292, 303
Rehtak, 397
Religious Creeds, 91
Residence, Influence of Change of, 277
Retemo, 253
Reynolds, Dr., 390
Rhodes, 397
Rhys, Professor, 292
Rice, Dr., 394
Richards, Dr. Vincent, 122, 374
Riga, Gulf of, 244
Rio-de-Janeiro, 397
Ripon, 302
Riversdale, 183
Roach, 303
Robben Island, xv., 53, 85, 132, 182, 273, 359, 365, 397; Heavy Mortality, 274

Robertson (Cape Colony), 182
Robinson, Mr., 323
Robley, General, 391
Rochester Priory, 290
Rogerson, Mr. John, 358
Roman Catholics, 43, 59, 102, 111, 167, 224, 235, 346, 347, 368
Romsdal, 204
Rose, Mr. H. A., 124
Ross, Dr., 397, 404
Roturua, Lake, 391
Roumania, 398
Roux, Dr., 88, 173
Ruschenberger, Mr., quoted, 337
Russia, x., 12, 43, 239, 398; Leprosy at Great Distances from the Sea, 241

Sabathu, 345, 396, 398
Sable Fish, 324
Sack-fish, 174, 182, 252
Safed, 322
Sajgaon (Kalapur), 384
Saldanha Bay, 134, 146, 175
Salem, 199
Salmon, 303
Salonica, 398
Salsette, 339, 340; Christians, 104, 342
Salt, 187; And Absence of Leprosy, xiv.; Craving for, 188; Imported into Madras, 347; Imported into Norway, 209; Mussulman Dealers in, 339; Supply of in Bygone Times, 188; tax, 117, 327
Salt Fish, 121, 303; And Labour, 132; And Railroads, 131; And War, 252; Dutch fond of, 130; Exported from Cape Colony, 144; Exported from Newfoundland, 307
Salt Tax in China, 327
Samarkand, 374, 398
Sambalpur, 398
Samoa, 213, 398
San Francisco, 237
San Remo, 63, 330
Sandwich Islands, xv., 76, 145, 170. 173, 207, 226, 228, 231, 263, 391. 398
Sandwith, Mr., 322
Santanda, 220
Sardinia, 398
Saturnin, Dr., quoted, 14
Savages (1759), 23
Schleishner, Dr., 206

Schmidt, Dr. H. Ernest, quoted, 383
Scotland, 289, 398
Scrofula, 47
Scutari, absence of lepers in, 406
Seals, 303
Segregation in Norway, 207, 274; in Java, 328; not complete in Middle Ages, 285, 300, 301; of little use as a preventive, v.
Selby, 61
Sexes, disproportionate prevalence of the disease in the, 110
Seychelles, 398
Shanghai, 15, 215, 399
Shangtung, 212
Shanse (near Pekin), 214
Shapter, Dr., 293, 301
Shapur, 399
Sheep, fluke disease in, 363
Shepstone, Sir Theophilus, 147
Sherburn Hospital, 294
Shetlands and Orkneys, 60, 96, 285, 335, 336
Shoa (Abyssinia), 370
Sialkot, 396, 399
Siam, 327
Siberia, 211, 245, 323, 398, 399
Sibsagar District (Upper Assam), 399
Sicily, 321, 400
Sierra Leone, 400
Sikkim, 197, 400
Simla, 196, 345
Simon's Town, 182
Simpson, Sir James, 289
Sind, 198, 344, 354, 400
Singapore, 400
Siva, 354
Skertchley, Mr. Sydney, 211, 327
Smart, Dr., 254
Smith, Dr., 238, 396
Smith, Dr. Jared, 234
Smyrna, 400
Snook, 175
Sokoto, 323
Solinus (240 A.D.), 332
Someren, Dr. van, 348
Somerset West, 85
Somner, quoted, 290
Soudan (Central), 323
South Africa, 56, 309
"Space-for-Time" Synoptic Schedule, 97, 98
Spain, 49, 64, 65, 98, 111, 167, 285, 286, 386, 400
Spedalskhed, a disease of the seacoast, 205
Sphakiots, 253, 309
Sprats, 303
Spratt, Captain T. A. B., quoted, 255, 256
Square, Dr. William, quoted, 298
St. Albans Abbey, 295, 300
St. Gile's Fields, 302
St. Helena, 402
St. Helena Bay (Cape Colony), 179
St. John, Captain, 326
St. Kitts, 402
St. Lucia, 402
St. Petersburg, x.
St. Vincent, 15, 402
Statements, careless, 163
Statistics — Baltic Provinces, 243; Capetown and Caledon, 134; Christian Lepers, 106; Colombia, 220, 225; Cretan Lepers, 254; Emjanyana Asylum, 317; Fish-eating Lepers in Cape Colony, 182; Fish Imports in Transvaal, 250; Indian, 337; Jain Community, 104, 105; Mangalore (Madras), 347; Natal, 147; North America, 238; Norway, 203; Sandwich Isles, 228; Salsette, 340; Sexes Compared (Bombay), 116; South Africa (General), 137; Victoria Colony, 267
Stavanger, 203
Stead, Mr., 309
Steenberg's Cove, 180
Stellenbosch, 132
Stepney, 401
Stewart, Mr., 345
Stewart, Rev. Charles, 227
Stock fish, 303
Stourbridge, 302
Stow, 107
Straits Settlements, 114, 161, 231, 401
Struiss Bay, 183
Sturgeon, 303
Sulu Archipelago, 402
Sumatra, 403
Sunda Islands, 327
Sunderbunds, 403
Surinam (Dutch Guiana), 403
Sutherland, Dr., quoted, 16
Svendborg Hospital (1436), 284
Swaziland, 312
Sweden, 66, 203, 285, 403
Sydney Hospital, 262
Sylhet, 403

Sylvester, Mr. J. H., 362
Symbiosis, 27
Symptoms, the, 87
Syphilis, 227, 289
Syria, 80, 322, 404
Szechuen, 212

Table Bay, 134
Tana Sea (Abyssinia), 370, 404
Tanganyika, 404
Tanjore, 353, 404
Tasmania, 405
Tarn-Taran Asylum, 106, 115, 157, 330, 396, 404
Taupu Lake, 391
Tchad Lake, 323
Tembuland, 52, 132, 313
Temoris, 308
Tenby, 292
Tench, 303
Tetanus, 50
Thana, 339
Thassos, 360
Théon, M., 63
The Times, Mr. Walter J. Hammond's letter to, 224
Thin, Dr., 275
Thompson, Dr. Ashburton, 229, 259, 266, 287
Tiberias, 322
Tientsin, 188, 215, 328
Tierra del Fuego, 405
Tilbury-Fox, Dr., 81
Tobago, 405
Torquin, 405
Tortola, 405
Tracadie, 13, 235, 405
Trans-Himalayan Districts, 405
Transvaal, 137, 182, 247, 250
Treatment, Port Wine, 238; Arsenic 279; Chaulmoogra Oil, 279; Entire Abstinence from Fish, 279; Isolation, 280; Mercury, 279; Nux Vomica, 279; Quinine, 279
"Trepany," 262
Trichinopoli, 405
Trinidad, 14, 116, 349, 405
Tripp, Dr., 390
Trondhjem, 64, 201, 203, 362
Troyes, 282
Tubercle Bacillus, 33, 272
Tuberculosis, 195, 272, 278, 280
Tugela River, 147
Turkard, Dr., 341
Turkestan, 240, 242, 374
Turkey, 406
Turner, Dr., 247

Uitlanders, 248
Umballa, 386, 406
Umondale, 184
Umtata, 143, 316
United States, Immunity of, 7, 406
Uomi, Lake, 406
Ural River, 240
Uruguay, 221

Vandyke, Carter, Dr., 81, 362
Vani, 105
Venezuela, 366, 406
Versfeldt, Mr., 185
Victoria, 261, 267, 406
Victoria Falls, 139
Virchow, Professor, 59, 201
Vizagapatam (Madras), 406
Vladivostok, 323
Volga, 239
Volo, 360

Wales, 292
Wallace, Dr. Alfred Russell, quoted, 361
Walpole, Sir Spencer, quoted, 335—336
Waterford Hospital, 293
Wazaristan, 406
Weir, Dr., 313, 316
Wesener, Dr., 361
West, Dr. Frank, 373
West Indies, 14, 111, 167, 237, 278, 331, 381, 382, 407
Wheeler, Mr. Thomas H., 219
Whelks, 303
White, Dr. Hoydon, 379
Wickliffe, 96
Wilson, Dr., 388, 399
Windt, Mr. H. de, 399
Wolter, Dr., 361
Women, Privation of, in Norway, 204
Wood, Dr., 232
Wood, Mr. H. T., 399
Woodhead, Dr. Sims, Objections to the Fish Hypothesis, xiii., 365
Worcester, 182
Worthington, Dr., 373
Wyllic, Dr., 309
Wyman, Dr., 382
Wymeswold, 225
Wymondham, 298

Xalaga District (C. Colony), 218
Ximenes de Quesava, 218

Yangtse, 211
Yellowlees, Dr., 84
Yianorantzoa (Madagascar), 388
York, 291
Young, Dr., quoted, 14
Yule, Colonel, quoted, 335

Zambesi, 139, 373, 407
Zambuco, Pasha, 254, 321, 359, 381, 406
Zanzibar, 49, 395
Zealand, New, 39, 58, 231, 391, 407
Zeryan (Persia), 395
Zikala, 149
Zululand, 147
Zulus, 49, 309
Zwaartkop, 152

THE END.

BRADBURY, AGNEW, & CO. LD., PRINTERS, LONDON AND TONBRIDGE.